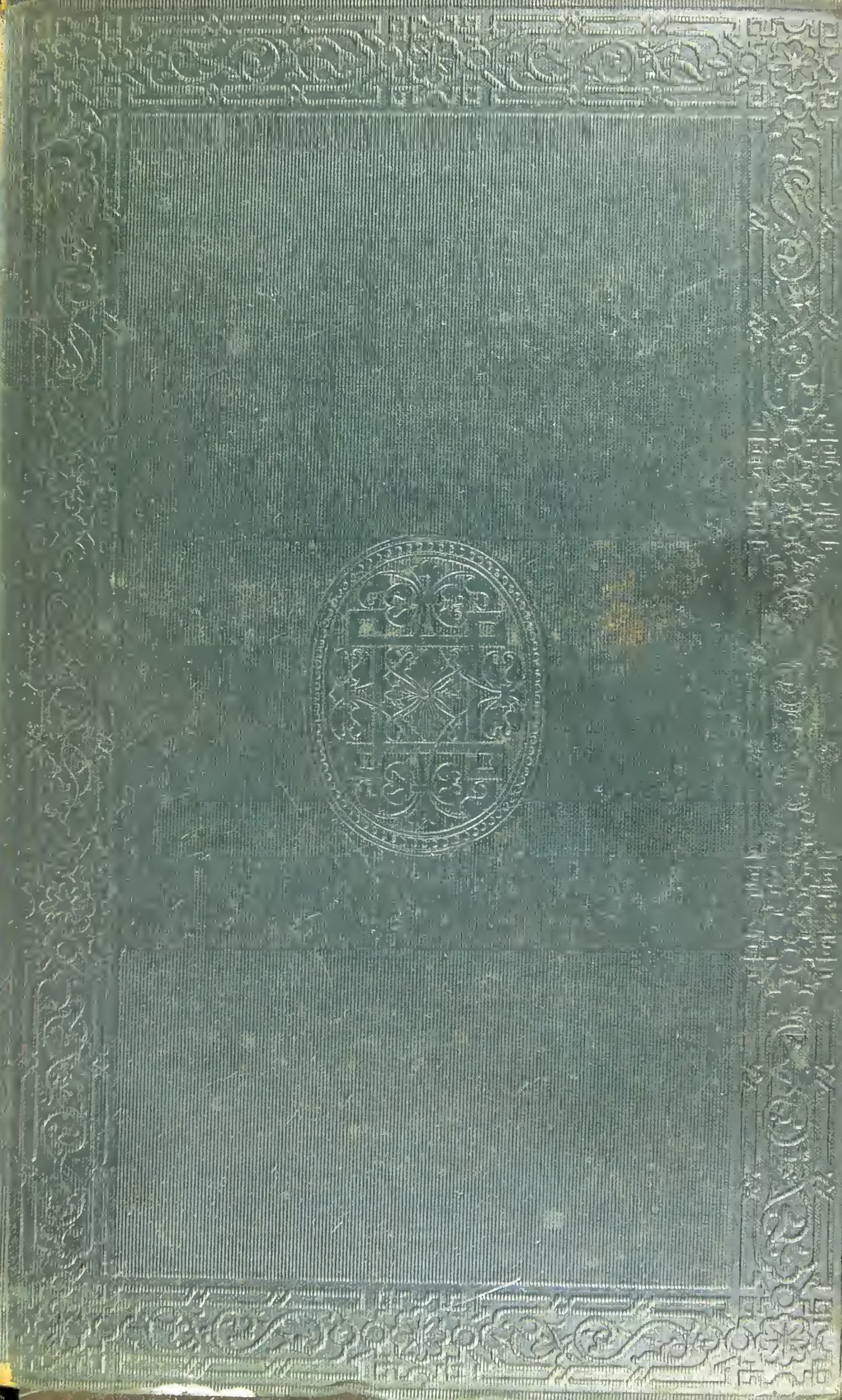

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SURGICAL PRACTICE.

LONDON:
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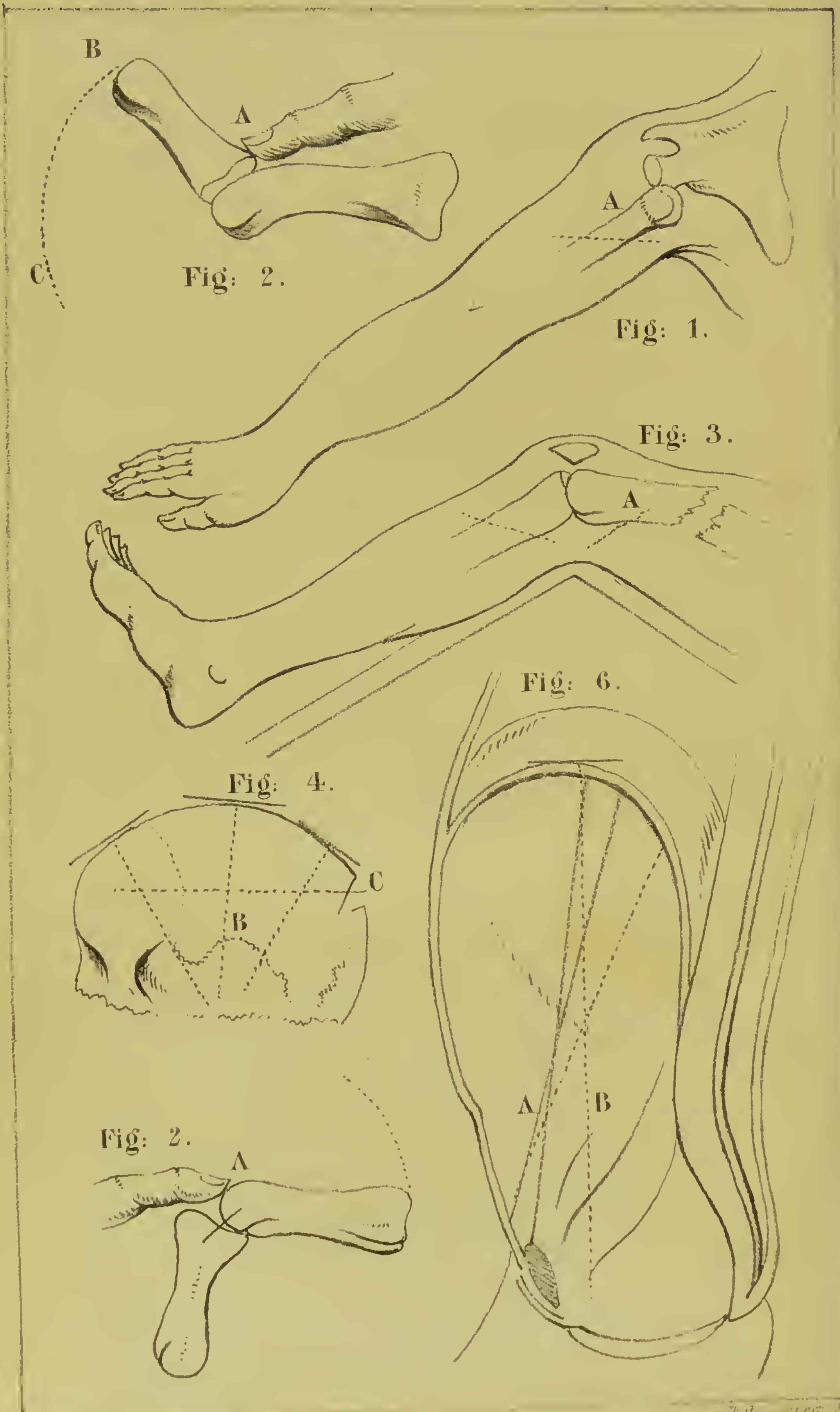

On Zinc by W. A. Delamotte

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OBSERVATIONS

ON

SOME OF THE PARTS

OF

SURGICAL PRACTICE:

TO WHICH IS PREFIXED

AN INQUIRY INTO THE CLAIMS THAT SURGERY MAY BE
SUPPOSED TO HAVE FOR BEING CLASSED AS
A SCIENCE.

BY

JOHN P. VINCENT,

LATE SENIOR SURGEON TO ST. BARTHOLOMEW'S HOSPITAL.

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AN INQUIRY

INTO

THE CLAIMS THAT SURGERY MAY BE SUPPOSED TO HAVE FOR BEING CLASSED AS A SCIENCE.

An investigation which has for its object the appropriate application of a term, must begin with a tolerably precise understanding of the subject on which the term is to be employed. In regard to the proposed inquiry, it must be admitted that there is no term more vaguely adopted, or more loosely applied, than the word Science. It is so inconsiderately brought into use, and placed in so obscure a point of view when adopted, in the ordinary language of the age, that it may be questioned, on many occasions where it occurs, whether it be designed to apply it to the exercise of the head or of the hands. Indeed, in some of the ways in which it is used, it seems to be applicable to the amount in which individuals are remunerated for their exertions, whether these have reference to the mind or to the body. Again, in those employments to which the world assigns the highest character in the exercise of the means of procuring competency, that is, professions, there seems to be an implied understanding that the persons engaged in them have a scientific condition of mind. But this is by no means true, as it may be found in some cases, that even the artizan exhibits a more scientific development of mind than the professional man, who possesses a higher degree of respectability in the eye of the world.

But however confused the way may be in which the term is adopted, and however much the want of clearness in fixing the precise distinctions that exist between science and art, it would seem that it is upon the acknowledged superiority of a scientific character that professional men lay claim to the advantages of the high ground they occupy. In this way it is probably assumed that professional men are necessarily men of science. The surgeon is by no means backward in putting in claims of this kind. But as the grounds of his pretensions may be questionable, it may fulfil an useful purpose to inquire into the validity of them, inasmuch as if these grounds are not found capable of vindicating the claim, it will show that surgeons have a duty, incumbent on them, of setting about acquiring the means of improving the scientific character of their profession, and therefore of affording increased benefit to the public, by infusing into their practice the powerful aids that real science must necessarily impart to it.

In centralising those glimmerings which are emitted from men's minds, when they speak of science, we discover that they evidently calculate upon some intellectual elaboration for educing its principles; and in this way allusion is made to the abstract sciences, as indicating some intellectual processes, independent of, or abstracted from matter, and not that intelligence of it, derived merely from the way it acts upon the senses. Surgeons, in making this kind of reference, often speak in a way, indicating that they felt that their branch of natural knowledge could never reach to the perfect state of real science; but that it might partake of some of its invaluable qualities, derived to it by a sort of collateral connection. Science is absolute, and its stream flows unalterably, retained in its secure banks, which admit no oozings of impure waters to sully its pellucid stream.

Whenever the question of science is discussed, there is always an allusion made to the mathematics, which is represented as a branch of intelligence pre-eminently scientific, but of an order so superior and distinct, that the understanding cannot be supposed to attain to an equal degree of scientific perfection in any branch of natural knowledge. The whole bearings of the question have not been sufficiently entered upon to allow this conclusion. It is true that the intellect more readily conceives the relations which number and quantity present to it, than it does those of other objects; this being necessary in order that the mind may acquire necessary truths. It cannot be predicated that natural knowledge is excluded from being placed in the elevated condition of absolute science, until the most proper means have been instituted for establishing its scientific character. It is not at all unlikely that a rooted habit of looking to the acuteness of the senses for the sources of its principles, has left surgery so long unenlightened by the beams which intellectual truths can throw around it.

In the conflicting notions that men have of science, they seem to imply that it may be attained by some other means than by the mental faculties, as if there was any other way by which absolute truth can be arrived at. Science is the comprehension of truth in any of the departments of knowledge*, over which the mind has the power of giving certainty to the results of its investigations. On the other hand, we constantly hear the term applied to the knowledge of things derived from the senses, and not from the intellect, and therefore such knowledge is neither fixed nor certain, because it is not capable of being demonstrated.

Science is represented as the clear knowledge of subjects presented to the mind, founded upon self-evident principles, with consequential and clearly connected demonstrations, which collectively amount to a body of demonstrated truths. But this train of operations can be only carried on by the intellect, fully and brilliantly shown in mathematical inquiries, so fully acknowledged by all; although men, and particularly medical men, continually understand by science that comprehension of things which is obtained by means only of the senses, but such sources are not admissible in science. The most vague conception of what mathematical science is, must show that all the intelligence* of things which the mere senses can convey will never form a system of demonstrated truths. The most perspicacious representation, derived from the senses, can never implant in the mind a single intellectual truth, which is to become the starting point of science. The anatomist prosecutes with zeal and ability the knowledge of the forms of the animal structure, and by such labours various observers have given different accounts of the muscular fibre, just as new and improved microscopes have come into use. The fact is, that this sort of discovery amounts to nothing, until the mind can elicit all the relations existing between objects, and then it really becomes a scientific enunciation.

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* Knowledge here signifies all information conveyed to the mind of whatsoever description.

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* Intelligence is meant to imply the degree of the understanding the mind has of any thing, however imperfect.

The existence of bodies, being a thing of no reasonable doubt, nor to be seriously questioned by any sober understanding, yet as to their nature they admit of no strict and rigorous demonstration upon the principle of sensation. No truth can be demonstrated but what has a dependence upon its principles, otherwise that by which the proof is to be made will want proof itself, and therefore is no demonstration. But where is the necessary connection between a sensation within, and the existence of bodies without?* "Sensus enim fallunt utique. Testimonium et informatio sensus semper sunt ex analogia hominis non ex analogia universi; atque prorsus magno errore asseritur, sensum esse mensuram rerum; sensus enim per se res infima est et aberrans." †

Science being a series of demonstrations derivable from absolute truths, the senses cannot afford that sort of intelligence of things upon which the principles of science may be founded. "The senses may be adequate and sufficient for the end which nature designed, to give advertisement of corporeal things without us, yet sense is not intellection. Sense is fixed in the material form, and not able to ascend to an abstract universal notion." ‡ Sense is not science or intellection, because the soul by sense does not perceive the things themselves, or the absolute nature of them, but only her own passions from them. Sense itself is but the passive perception of some individual, material forms. The senses do not discover what bodies are in themselves, so much as what they are in relation to us. There is no necessary connection between a sensation within, and the existence of bodies without, by which it may be reasoned demonstratively from one to the other.*

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* An Essay on the Theory of the Ideal or Intelligible World, by J. Norris.

† Bacon.

‡ A Treatise concerning Eternal and Immutable Morality, by R. Cudworth, D. D.

In the House of Wisdom, the ideal fabric stands upon a more stable foundation than the frame of external nature; and as sure as the sensible world is, the intelligible world is yet surer.* The intellectual powers commence these operations by supplying and exercising eternal truths, which are the same as eternal habitudes or relations of things, such as are necessarily, immutably, and perpetually the same. These are the standing and indefectible objects of science. Without such truths there could be no such thing as science, because necessary and eternal truths are the grounds of demonstration. Thus we find that in arithmetic every body has implanted in his intellect a clear comprehension that four units, however varied, make the number four, and can by no possibility make any other. In the same way, the moment the mind discovers that a circle is produced by the revolution of its radius, the intellect understands that there is that relation between the radius and circumference, or the circle itself, that is necessary, invariable, and perpetual. The perfect knowledge of the circle is at once acquired by the intellect, on discovering the relations in its parts. In this way it is that " Science is the comprehension of that which necessarily is;"* and no intelligence we can have of things that has not this condition, can be admitted as science.

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* Norris.

Thus science is properly represented as that clear and complete knowledge of subjects possessed by the mind, founded upon self-evident principles, and with consequential demonstrations, so that they amount to a body of demonstrated truths. And the result of what has been considered is to show that it must be on much more certain grounds, than the mere representation, which the exercise of the senses can convey, that science is to be founded. The senses, however assisted by the ingenuity and improvement of art, cannot be made to afford to the mind that perfect intelligence which is the necessary condition for the discovery of truth. The use of the microscope affords little for the improvement of science until it begins to lay open to the mind relations before unknown. In the investigation into the quality of science, we must look up to some higher condition of the mind than that which may be produced by the perception of external bodies. This is the light in which the expression, intellectual science, is expected to be viewed, more particularly when applied to the mathematics. Whatever may be the impression which external objects make on the mind by simple perception, the only scientific intelligence that can be received of them must be derived from a procedure intimately connected with the mind itself. It is only in the laboratory of mental operations that absolute and necessary truths can be produced. It is on account of this fact not being clearly understood, that men, and more especially medical men, have been wrongly led to imagine that investigations carried on upon the mere principle of their perceptions of external objects, could educe those conditions that are required to form a science.

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* Cudworth.

No one can be ignorant that however perfectly a straight line may be drawn on paper, when it is placed in the field of a microscope, it no longer appears to be a clean, even, line, as it did before; but it is now represented as not only having a degree of breadth before unnoticed, but that this breadth is of different thickness in different parts, and also that it no longer appears accurately straight. Such a line viewed by a geometrician excites no other idea in him than in others unacquainted with geometry, as long as it is seen alone. But if another line, equally awkward, be placed in juxtaposition, either parallel, obliquely to it, or across it, then the geometrician catches all the relations which these lines have with each other, and by this he arrives at immutable truths. A glance at the possible relations is enough, his conviction is complete, his conclusions are sure, and he is engaged in a strictly scientific procedure. The intellect has made itself master of the relations which the two lines bear between each other, when it has nothing further to borrow from perceptions without itself; he rejects, as unfit for any further use, the clumsy lines that the hand could not better make; and adopts the delicate and accurate ones that are formed by a geometrician's intellect as the only ones suited for the purposes of true science. I need only allude to this difference in the powers of the intellect over that knowledge which is to be obtained by the mere perceptions, to establish the fact that the seat of science is entirely in the mind.

The mind is known as being a manifestation of the connection of the soul with the body. It is the depository and conservatory of all the intelligences that can be comprehended. It is a tablet upon which the characters of eternal truths can be impressed. And it has the reflex power of thinking upon and deciphering these characters, which are imparted to it. It derives from the soul the power of discovering necessary and eternal truths, and convinces us of our existence, and of the attributes of omniscience and eternity, manifested in the creation. The essential and authoritative quality of the mind, as the most purely intellectual, must be referred to the soul as its source. Therefore, that which is really and fully apprehended and understood in the mind, arises from the thinking powers of the soul.*

" The human mind does not see the nature of things by pure intellection, for in that case all knowledge would be immediately and already understood by simple impressions on the mind; but by intellection. The comprehension of truth is an inward, active energy of the mind itself, and the displaying of its own vigour from within, whereby it doth conquer, master, and command objects; and so beget a clear, serene, victorious, and satisfactory sense within itself.† It is not allowed to created beings to see the essence of things; and the mind cannot comprehend any thing by direct intuition, this being the attribute of omniscience." " But the mind can reflect upon her own actions and upon her own sensations; and the mind need not go out of herself for the perception of any of them, because they are in herself." ‡

Life implies action, and the action of the mind is thought, in the same way that the action of the body is motion.‡ Thought is an operation of the mind which we are conscious of when it is employed abstractedly from its object; and it is a process by which we become inwardly conscious of what is passing in our minds. It is by thought that the mind of man may ascend to the highest point of intellectuality; and without it, acting from the impulse of simple perceptions, men would be left at the lowest level of understanding. There is a difference of thinking from mere perception, and thinking by way of desire. We can will to think, and we can think in opposition to will. And the will can not only give the direction but the intensity of thought, when in its most individual and unaffected state. Action to produce results must have more than one thing to employ its force, and there must be some specialities upon which thought may act — these are ideas. This is a term which has been adapted to the intelligence the mind receives from the mere perception of external objects; but the ideas which are engaged in the reasoning quality of the mind, under the ministration of thought, are purely intellectual ideas.

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* Norris. † Cudworth. ‡ Norris.

Intellectual ideas are not created by the mind for occasional purposes, nor are they the creatures of the will, but they are inherent and indefectibly consistent with it. The mind by a reflex act not only can contemplate intellectual ideas, but the relations that exist between them.* The instance quoted of the perfect comprehension which the mind gets of the mathematical line of no breadth and perfect straightness, by merely placing two lines any way across each other, is a proof of the extent of analysing power acquired by the intellectual perceptions of abstract and immutable ideas. "Intellectual ideas are essentially an integral part of the mind, imparted to it by the soul, that is, by the Author of all wisdom, and therefore men cannot instruct us by giving intellectual ideas of things, but only by making us attentive to those we have, and by exercising them to the greatest extent."* "All ideas, even those of external objects, must be intimately united to the mind, as being the only way they can be the objects of the mind." Besides the ideas of things which are intelligible to us, and of which we have a clear perception, there are others that are intelligible in themselves and not so to us, and of which we have no clear perception; this is exemplified in the case of the diagonal of a square being incommensurable with the side.†

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* Norris.

Intellectual ideas regarded as the instruments employed by the powers of thought for discovering immutable or necessary truths, are recognised in the mental act by which we think. The mind feels difficulty in thinking upon some things, and requires exertion to produce attention; there is also labour in thinking; thus proving that thought must be an active principle. By the active powers of thinking, the intellectual perceptions discover the relations and habitudes of intelligible ideas. In this way it is that all science must be abstract, in conformity with that acceptation of the term which is applied to the mathematics and to other strict sciences. And although the human mind is not gifted with the perception of seeing the absolute nature of things by simple intuition; yet by the agency of its endowed intellectual processes, it may be declared to be able to discover absolute and eternal truths, or the immutable nature of things.

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* Malebranche's Recherche de la Vérité.

† Norris.

" The very act of thinking may be the object of thought, by the reflex way of thinking, or by turning its view inwards." This distinguishes the character of a thinking man. All the world, in one way or in another, thinks; but there are only here and there some who reflect, and carefully and attentively observe what is doing in their own minds. Reflex thinking teaches us the knowledge of ourselves, a knowledge that few value, and from which most persons industriously fly. It is by reflection that we come to know the true state of human nature, and perhaps to discover its dignity and its excellency. " Thought is not held in the estimation it is entitled to, and few are either masters or judges of it, by its not answering the ends of those who court popularity, which is more easily acquired by having an insight into a great deal superficially, than by the intellectual accomplishment of intense thinking; which is reckoned of less account, and therefore less followed." *

The object which has been kept in view in making these psychological observations, is to show that there may be very wide degrees of the powers in the human mind calculated for the investigation of truths. Of course the understanding, which is the intelligence or comprehension which the mind acquires of any subject with which it is occupied, must vary in proportion to the intellectuality of the individual mind, which is engaged in the inquiry. When the understanding is easily satisfied, owing either to the low order of the individual mind, and inability of it to mount higher than the simple perception of first impressions, it gives its own assent to the completeness of the intelligence it has received, and by such an easy process the judgment is formed. This sort of judgment is not only very often low in the scale of intellectuality, but may descend to a degree that excludes the very application of the name of judgment. Opinion is so much the guide of medical conduct, that it is sometimes actually regarded and valued as much as a sound judgment. "Opinion is nothing else but a vain, easy, crude, and imperfect judgment of things, taken upon slight and insufficient grounds; too credulous assent to our outward senses which rests upon the appearance of things, without referring the matter

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* Norris

to be thoroughly examined and digested by the intellectual powers. Opinion is most commonly a false, fleeting, and uncertain thing."* Quæ in opinione fundata sunt, variantur, non augentur.† Real science has a much more noble foundation for its basis than crude, undigested opinions, however acute or perspicacious; it must be sought in the recesses of the intellectual powers.

It has been conceived, that strict science in natural knowledge is unattainable, because the subject has but little analogy with the intellectual ideas, which at once perceive the relations and habits, when simple number or quantity are submitted to mental dynamics; and that there is an inapplicability in their nature, to be applied to the objects of the material world. But the capacity of the intellect is such, that it can adjust the lines of truth in every quarter of the creation; for absolute wisdom has founded all nature in truth. In all the objects of natural knowledge there are sufficient numbers of salient points and prominent elevations to which the mental theodolite and quadrant may be applied in every survey, to which the mind may direct its attention. And in this way may be obtained those relations, which become fundamental points for establishing the foundation of science.

The machinery of the mind is more or less perfectly constructed; and individuals vary considerably, as they possess, or as they bring into use, the more perfect or the more imperfect means for eliciting truths. There is a very considerable variation arising from the affection and aptitudes of different minds, in giving the direction and exciting the energies to one class of intellectual exercises rather than to others. As the compliance with this partiality is always accompanied by more earnestness than when the mental energies are otherwise employed, so the greatest powers of the mind are then most likely to be developed.

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* Charron, de la Sagesse.

† Bacon.

There is an inherent difference in the quality of the intellect, which produces a marked distinction in the capability and power which the mind possesses. The very acute and perspicuous Pascal* has described the minds of men to be readily divided into two classes; the one that of "l'esprit de finesse," the other "l'esprit de géométrie." The character of "l'esprit de finesse" indicates that when the mind is satisfied with the acuteness of its penetration, and the clearness and correctness of its perceptions, it has sufficient for convincing the understanding. And therefore this kind of mind forms its judgment upon such principles only; being unaccustomed to the laborious processes of the geometrical mind. "L'esprit fin, ou, de finesse," may be turned into English by the word perceptuous, as the conception of it has arisen from the supposed sufficiency of the perceptions to ground a judgment. But the English word more analogous to the French is, subtle mind.

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* Pascal, Pensées, &c.

But it has been shown that to be satisfied with the soundness of principles, they must be founded on some necessary and immutable truths. And it has been stated above that the mind can only apprehend the truth of things by means of those relations which the intellect has the power of discovering. It will thus be seen, that while the perceptuous character of mind clearly and correctly sees all that perception can convey to it, it is satisfied that it has ascended to the very limits of information that the understanding can have. But the geometrical character carries its powers of intellectual investigations to much higher regions than those to which the other can arrive. In the allusion made, in reference to this quality of mind, to geometry, it is not supposed that a high degree of mathematical acquirements should be possessed; it is only intended to show that the intellect, to be entitled to the appellation, should have the facility of noticing all the relations of things that are presented to observation, and the power of comparing them in the mind; so that by an abstract process the principles of science may be elicited.

It will be evident, from what has been said, that in prosecuting an inquiry, which has the character of science for its subject, the peculiarities of these two descriptions of mind must form a most important portion of the investigation.

The perceptuous mind ("l'esprit de finesse") engages itself upon that which is obvious and clearly presented to its view; therefore its application is in constant use, and obvious to all. The will strongly inclines the mind to admit the opinions so formed as truths, obtained as they are without the labour of the analysing process of thinking. As the powers of the perceptuous mind cannot exercise itself in intelligences beyond that which it clearly perceives, it is impressed with a conviction it has reached the ultimate limits of human understanding, at a point where the higher order of the intellectual faculties may be supposed only to begin. The construction of the perceptuous mind does not include the processes by which the bounds of science may be enlarged. It is too limited in its power to enable it to penetrate to the principles of things. This cast of mind obtains in all those who do not think deeply, which is a class of great extent in numbers. In this way, many are admitted to be men of science, without having that character of the mind correctly entitling them to such a description. The quality of this cast of mind being that of having the ability of seeing clearly the objects of their perception, so it gives to those who possess it a ready way of knowing and adverting to the most appropriate diction, for expressing their opinions. In this way it is that so many people have the credit of being of a scientific mind, who really have the slightest pretensions for such a character. A clear conception of what presents itself to the understanding, and a favourable memory for retaining this knowledge, are circumstances that generally establish the possessor to be scientific, although he may hardly have a spark of that intellectual light, which is absolutely necessary for those to possess who are to improve and enlarge science. It is a very different thing merely to know what others have done for enlarging the boundaries of science, to that of possessing the intellectual power, adapted for increasing its principles.

The essential quality of the intellectual character of the mind has been explained, in the allusion to the geometrical problems that arise, by simply placing two lines across each other. It is that quality of intellect which quickly understands the intelligible ideas of things in a way by which all the relations, in every possible condition in which those things can exist, are discoverable; the only way the real nature of things, and the fundamental truths of science can be obtained. It must be apparent that although the perceptuous character is best calculated for a clear conception and accurate description of all the facts subservient to science, and for placing them in the best point of view to be comprehended by others, yet it is limited in its capability to promote science. But it has those qualities particularly well suited to produce compilations and dictionaries; labours which afford considerable and valuable assistance to those engaged in the prosecution of scientific acquirements. But we do not find, nor are we to expect it should be so, that new principles should be discovered, or that the field of real science should be enlarged by such a cast of mind. "Fortasse enim destituetur, nec habebit facultatem et commoditatem talia media comparandi et procurandi."*

It is only necessary to take a cursory view of the world to discover that, whilst men who have no real scientific intellects are allowed to enjoy the fullest advantages, which the just application of the title can confer, the most part of men, having no greater scope of intellect than these pretenders, readily concede to them the credit of such pretensions. When the gentle and willing empire of opinion † is founded, the toil of intellectual labour is never supposed to be necessary, or never properly conceived to be the real distinction of a scientific mind. "Error imperiosus et magistralis, ita demum compositus, ut potius fidem imperet, quam examini subjiciatur." ‡

It is an instance of the prevalence of this magisterial power of opinion, and of the prevailing notion of the sufficiency of the mere perceptuous knowledge of things, when placed in combination with memory, and keeping out of view the real advantage of the intellectual faculties of the mind, that those who have of late years put themselves forward as the best prescribers for medical education, have conceived that in huddling together all sorts of ingredients for the students to swallow, they formed the surest way of perfecting the qualification of those dedicated to the healing art. The folly of such propositions must be apparent, even upon the principle that they could not be carried out in a way to be perfect. But the remarkable folly is that they should be so ignorant of the real nature of science. Science is a system of demonstrations, and a demonstration must engage the mind in deliberations: deliberation is the employment of the intellect upon one or a series of inquiries into the relations of things. It must be, therefore, incompatible in a scientific mind to suppose that education can go on without periods of reflection. There must be resting stations for the repose of thought, that all the conditions and relations of each part of the subject, may be deliberately viewed, and brought into their proper positions and assigned relations.

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* Bacon. † Pascal. ‡ Bacon.

So far from giving the profession the real character of science, by making no distinctions in its branches, such a step must inevitably destroy the little pretensions it has for being classed as such. The suggestion entirely avoids all the material advantage of forming the mind to exercise its powers, and of adopting a beneficial way of making use of what is really known. At the present time the encouragement to induce young men to follow up their studies and improve themselves, has no precise bearing upon real scientific pursuits, as it incites them to mere accumulation; the ant, and not the bee, is made the symbol of their endeavours. "Empirici formicæ more congerunt tantum et utuntur. Apis vero materiam ex floribus horti et agri elicit, sed tamen eam propria facultate vertit et digerit."* We find, in the very inducements offered to young men to prosecute their studies with assiduity and precision, that the course laid down is only applicable to the quantity of the mere knowledge of things, and to the capacity of the memory to retain this knowledge. The deep and weighty matter of the development of that intellect which can make this knowledge available, wherever it can be brought into operation, is lost sight of; and science and improvement stand still.

If the processes by which the minds of young men, intended for the profession, are not fully developed in a scientific way, and the expansion of the intellect is not encouraged by those means proper to advance it, we cannot be surprised that surgery should not present itself with the illuminated features of a science. "Tempus, tanquam fluvius, levia et inflata ad nos devexerit, gravia et solida demerserit."* If it be argued that the imperfection in prosecuting scientific surgery arises from the nature of the subject, and not from a defective cultivation with this view, it may be truly said here, that we have an example in a branch of natural knowledge, not more calculated for admitting the expansive force of philosophy than surgery—in comparative anatomy; upon which the brilliant labours of Professor Owen, following the steps of his great British and French predecessors in this department, have stamped with bold relief the indelible impression of science. And it may be well asked, why surgery does not take an equally high position, when it is supposed to be nurtured within the same walls as the other branch of knowledge? "Videntur nobis homines, nec opes nec vires suas bene nosse; verum de illis majora, quam par est, de his minora credere."*

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* Bacon.

In this stage of the investigation it will be allowable to allude to the influence, which the education of the physician produces over that of the surgeon. The latter having a large field of natural objects to place before the observers of all classes, which being capable of producing to their unscientific understandings an intelligence which they accept as complete, have acquired a degree of consideration, which intellectually can hardly be accorded to them. On the other hand, in Medicine there are not those obvious presentations of particulars which fix the observation, and conduct the observers readily to form their conclusions; and which conclusions they conceive to be acknowledged to be just by others. There appears to be a marked difference in the intellectuality of the physicians, who have been educated at the universities, by which it may be perceived, that more is done by such cultivated minds in giving a scientific turn to their investigations, than by surgeons; although they have much fewer objects to offer to the perceptive faculties.

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* Bacon.

In viewing the transition of the student in surgery to his state of a practitioner, we find him generally stored with a large collection of the parts of knowledge, and of the opinions of medical men; but he is often ignorant of the processes of cultivation, for the purpose of fructifying the soil, and producing the best harvest of scientific principles. Thus we find him often ill founded in those principles which are calculated to use his knowledge to the best advantage; and to improve it as a science, is out of the question. All his solicitude in practice is to look up to the opinion of the day. This opinion, without having the value of any scientific proposition, or founded on the judgment of an intellectual reasoning, is well followed, until another on the subject arises to supersede the former. Thus, in fact, it may be truly declared that the practice of surgery is little more than a collection of opinions, unstable and fleeting, and generally prescribed by those whose position in the surgical society of the day gives them tone. That opinions have but a small value in a scientific point of view, is proved by their unstableness, and by the readiness with which they are changed. Thus the practice of surgery is apparently not only taught, but pursued, by prescription, and but little on principles of science.

The qualifications of the practitioner who may be placed within the pale of the preceding description, are such as Bacon entitled empirici; the knowledge required for such practice is heaped up, and cast, as it were, into the memory, and then any part is taken out separately, as it may be wanted, and for a limited purpose, without any regard to all the conditions under which it may exist in relation with other things. This cannot be called scientific practice. For the purposes of scientific practice the mind must be contemplative, and ponder on every step as it proceeds, in which way it institutes every means of making comparisons, of analysing the conditions, and of studying the relations in disease ; and the scientific man, knowing the foundation by which he is supported, reposes in confidence on the security of the plans he adopts. The fact is, that it is not the possession of all that is known in all the branches of the surgeon's profession, that necessarily implies that he is a scientific man, or that he practises scientifically. It is the scientific quality of his mind that enables him to give the character of science to that which he knows, by making those correct observations upon all the conditions and variations of things when presented to him, by which he can draw sure inferences, and adopt correct proceedings for the advantage of his patient. It is in the intellectual character of the mind, and not in the quantity of the knowledge he possesses, that we are to look for a scientific practitioner. So true is this, that the converse proposition may be taken as an axiom, viz. that the good practitioner has that intellectual quality of mind, which is characteristic of science; that he has the faculty of comparing and of associating all the relations he discovers, so that he obtains a combination of facts connected by scientific principles; and does not conduct his proceedings upon the opinions of others, or even of his own, presented as they usually are, without any deliberation to sanction their value.

It must have been observed by those who mix with medical men, that the benefit conferred upon patients is by no means commensurate with the course of education of the practitioner; for many men are known to have had very slender instruction, who are excellent practitioners. And, again, many who have had elaborate means of qualifying themselves, and who have thereby acquired a high character, have yet been below others either in the faculty of discovering, or in the management of disease. If surgery were really taught in the way of a science such discrepancies would not occur, because as truth is the very essence of science, what was taught as a science would carry with it all the powers of its influence, and maintain the certainty of its results. It may be again repeated that surgery is both taught and practised by prescription. And although it may, without doubt, be made to assume all the characters and the improved value of a scientific profession, it hardly yet presents itself with claims to be called a science, in the just and legitimate acceptation of this word.

It is a fact admitted by all observers, that great and persisting processes of nature are carried on by an under current. It is not by looking on the swelling and impetuous wave, beating against breakers, but in observing what is going on in the gentle ripplings of the ebb tide, that the philosopher is best enabled to institute his inquiries, and to draw his safest conclusions. It is so in medical practice: whilst the practitioner, relying upon the efficiency of his remedies, is confidently expecting to prove their curative powers, he is obliged to acknowledge that disease unalterably advances to a destructive end. And, on the other hand, the attendant may sometimes find, that when he despairs of his means, the processes of nature, quietly working under a concealed influence, slowly perfect the unlooked-for cure. The medical man tasks his memory to the suggestion of some expedient to meet the various changes that occur in disease, thinking to display the cleverness of his art in the application of it to every contingency; but this ends in a failure, and he proves that his profession is conjectural and defective, and not a science. In this way it is that many persons, particularly those who are well educated, set but little value upon the remedies that are prescribed for them. Ingenuousness in medical men, as in all, would do more to elevate the character, by candidly admitting the limits of their means, than any attempt to display surpassing ability. Science is of itself clear as light, and not "mera palpatio, quali homines in noctu utuntur, omnia pertentando si forte in rectam viam incidere detur." *

In studying the habitudes of the human mind, from its full development to the close of life, we may observe in most men that, as life advances, the mind gradually recedes from the trouble of getting the materials of its contemplation from without, and individuals turn inwardly to survey and enjoy those intellectual fruits which have been the product of their own especial cultivation. He who would preserve himself from the hebetude of age must in early life store his mind with truths which he himself has educed. Youth may have its own blandishments, but age has also its comforts in reviewing the unfailing truths it has acquired in the progress of life. These reflections apply especially to surgeons, in reference to the state of

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* Bacon.

their professional acquirements, who ought to do more than just carry about with them all their lives the substance of other persons' surgery. The surgeon, by the helpful quality of his memory, and by his assiduity in obtaining information, may be possessed of all the information of his time; and he may suppose he has quite enough to form, not only the basis, but the superstructure of the practice with which he is to pursue his career. But if the surgeon does not construct a surgery of his own, as he goes on in life, he will find he has no useful resources, when referring to the opinions and views he has borrowed from others on whom he has been used to lean; and having omitted to fill a storehouse with the useful principles of his own establishing, he will retain but a slender share of usefulness in his position. Such have not, and therefore perhaps will not value, experience; which I have known to happen.

Surgeons are in the habit of making use of the term Mechanics; and of adopting proceedings, to which they give this name. But that art to which they usually apply the term, is totally different from that which is truly and mathematically mechanics; so that an instructed observer might well ridicule, on some occasions, the use of the term. Mechanics, properly understood, would assist the surgeons continually in their manipulations; and what is more, save the occasion of much pain to patients; so that, on the score of humanity, it is not creditable to practise the profession uninstructed in this well-known scientific attainment.

If surgeons felt fully the desire of throwing a scientific mantle over their profession, they would embrace with avidity every branch of science that could administer to its perfection. Sir John Herschel has thus expressed himself: — "Dynamics is placed at the head of all sciences, and, happily for human knowledge, it is one in which the highest certainty is attainable — a certainty in no way inferior to mathematical demonstration." This philosopher displays, with lively animation, the prospects which mechanics offer of conferring the character of science on chemistry. Surgery may be supposed to be, as a science, buried in the icy fetters of the Arctic pole; and no noontide beam has yet thrown its horizontal ray across this frozen region, to intimate that the night of days, or of weeks, may be at an end. We have brilliant examples of great scientific discoveries made by intellectual minds, when strenuously sustained in carrying on the work. The great astronomer Kepler laboured incessantly for nearly fourteen years before he finally perfected the demonstration of his celebrated theorem, which expounded the laws of gravity in their application to the planetary system, by which astronomy was made a perfect science; the splendid discoveries of Newton confirmed; and his own name celebrated in philosophy; thus showing that he had resources, by which he overcame all difficulties, and a penetration of mind that led him out of all perplexities.

In discussing the quality of the mind in reference to the progress of science, it is clear that the display of intellect is something very different from the mere acquisition of information. Every one must have noticed that he has often heard from the most uneducated countryman, wiser observations and juster conclusions, than from other persons, the best instructed. We may add to this observation the eagerness with which some well-informed medical men suggest mere trifles as discoveries of value, and the jealousy exhibited of claiming the authorship. "Illa credulitas ingens damnum scientiis intulit, ut, absque insigni aliquo augmento, exsangues jacerent." *

The turn for mathematics is so particularly an indication of intellectuality, that the study of this science must powerfully contribute to form and improve the highest qualities of the mind. And, as it has been expressed before, it is of all things best adapted to accustom the mind to exercise the habit of studying the relations of intellectual ideas. A celebrated mathematician, M. De Morgan, says, that mathematical inquiries are not more difficult to pursue, than the proceedings a porter would take to

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* Bacon.

carry a parcel to some part of the town, with which he was unacquainted. Every body knows arithmetic, and the certainty that two and two make four, and probably, also, that if the radius is given, the whole circle is given. It cannot be asserted that any mind is totally deficient in comprehending the first steps of this science; and perseverance in application may reasonably be supposed to implant some degree of sufficiency.

The variations that occur in the application of the mind, either in regard to science, or generally to the purposes of life, arising from the innate distinction of the intellectual powers, must unquestionably attract a large share of consideration. As the mind is in truth the very principle of life, when applied to the actions of man, and to the relations which he has to all around him, so it is of great importance to determine every bias that may give it an impetus in a particular direction, by which a disturbing force is created in the calculation of its operations. It is therefore not at all irrelative to an inquiry that has science for its subject, to allude to those influences which prevail over the intellect, and give it an especial direction or power; by knowing which we may obtain a just estimate of its capability. The distinction between the perceptuous and the geometrical character of mind is, for the most part, fully striking in the powers each possesses. Thus we do not see, with all the apparent ability that men of the perceptuous quality of mind exhibit, any indication of their possessing the quality of invention, that is, of discovering any thing to enlarge the field of cultivated science.

The difference observable in the mental capacities of mankind, does not always depend upon the simple distinctions of the natural endowment, for it also depends upon the artificial means by which they are gradually led to understand mankind itself. All the inducements, that the intercourse with the world hold out as motives for action, have a constant and prevailing influence to encourage the adoption of that character of mind which is best calculated to promote interests; that is, if not of sowing the seed, of encouraging the growth, of the perceptuous or the subtle turn of mind, and therefore of choking the very peering of the real intellectual plant. All the incitements to wealth, power, and position, are attractions to cultivate and strengthen the subtle character. And the medical profession, being one of competition especially, engages in its service the art best adapted for acquiring public opinion. And thus it is that subtlety is reputed to be talent. This bustling and fretful state does not allow of the quiet and unimposing demeanour which intellect delights in. All the desires and inclinations of the subtle mind are fostered by the imperfect construction of the scheme of actual life;

while the aspirations of the intellectual are smothered by the insatiable nature of cupidity. "Misericordia in eo et perfidia pari jure dilectæ. Nulla apud eum turpis ratio vincendi. Blandus pariter et invidiosus in alloquio; in seria et jocos artifex. Amicitias utilitate non fide colebat. Inter hæc eloquentia insignis; oratio acuminis et solertiæ plena, ut nec ornatui facilitas, nec facilitati inventionum deesset ornatus."*

Those who are fully satisfied that scientific surgery is making great advances, should produce the proofs necessary to substantiate the fact, and give the instances of the close connection of science with surgery. It appears to me that the most part of what is handed down to us, is rather a series of mere opinions, as they have been successively formed, with continual changes, than a code of scientific principles. We have, indeed, received the benefits of men of talent, in bringing new facts to light, but only with the results like those of the artist in his studio, or the manipulator in his museum — representations of things. We have no display of a master-intellect, that has elicited, by the discovery of relations, immutable truths, and combined them into an associated whole, so as to make a science of surgery. Hunter had a mind constituted for accomplishing this great work. He is admired but not followed.

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* Justin.

I confess I have been much surprised to find that so many surgeons of a high repute in the profession, and whose faculties appear to have been exclusively devoted to surgery, and yet who have not, in their writings, even approached the way that leads to scientific surgery.

The great importance which is attached to operative surgery, does not in my mind confer any compliment to the scientific character of surgery. All men are, perhaps, desirous of possessing the ability of accomplishing some purpose that may draw to them admiration. Surgeons, whose qualities of mind hardly rise to that level in which intellect can direct them to real scientific studies, fix upon the display of operative surgery as a department in which they think to shine. In estimating the success of operations, we find that a large proportion are unsuccessful, although performed upon principles that are admissible ; but what is very startling, a vast number are continually performed which would be inadmissible, if science had enlightened surgeons, and enabled them to form correct judgments. Surgery, as a science, would decide many questions in the way of avoiding operations. The surgeon too eager for performing operations is not likely to impart scientific principles to his art.

In the collections of the periodical essays of the last century, where so many papers are found distinguished by the elegance of the diction, the correctness of the sentiments, and the soundness of the judgment, as to grace the age in which they appeared, there is one*, in which a proposition is made to discuss a question that would determine the degree of hindrance, the world had sustained for so long a time, in the progress of science, by the long-continued empire of the peripatetic philosophy. This would be, no doubt, an interesting investigation; but in carrying it on, the first element in the proposition should be settled—which is, the condition of the mind that seems so universally to prevail, by which men surrender their judgments to the opinions of others. Is it that they thus readily assent to that which is acquired without the labour and, perhaps, without the ability, of thinking? "Opinion ne peut rendre sage les fous; mais elle les rend contents." †

We are not to exclude from notice that power which language exerts over the minds of men. It has an empire which infringes upon the free exercise of the intellect. History has pointed out the fact that it has changed philosophy for sophistry. The striking and brilliant clothing of words, that oratory can put on, leaves the intellect in bondage; and the mind is satisfied with mere perceptions, which afford only a hollow conviction to the understanding. It is in science, as in every thing else, that a clear and happy mode of expression affords great advantage to the reader or hearer; but it lulls him into an affection for complying with what is proposed to his understanding, without any demand on the energies of thinking; and in this very way, it ensnares him into a readiness to give assent, before he has deliberated. "Diligentem veri cognitionem, atque acre studium philosophiæ, verborum splendor nonnihil impediat, quoniam præpropere mentem consopit."* Men of a merely perceptuous turn of mind set down as science, that which is only fact clearly and correctly displayed.

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* The Adventurer.

† Pascal.

The improvement of surgery upon scientific principles, must commence and proceed by investigating the more common instances of disease, by which there is afforded a larger field for making observations, a wider latitude for determining the relations, and a greater facility for obtaining the points of bearing the facts have with each other, than the consideration of rare specimens of disease can afford. In this way only is the greatest knowledge of disease to be acquired. The simple and elementary principles are to be first understood in learning any science. Surgeons, by attaching so much importance to rare cases of disease, rarely do more for the benefit of surgery than giving currency to ill-formed opinions. "Ce n'est pas dans les choses extraordinaires et bizarres que se trouve l'excellence de quelque genre que ce soit."†

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* Bacon.

† Pascal.

Another impediment to the progress of scientific surgery is an impression existing in the minds of men, by fancying that the best road that philosophy can take, for discovering the nature of all things, is to be able to demonstrate the ultimate moleculæ of matter. There has always been inquiry going on after the philosopher's stone, in some way or other; and although the inquiries have had no other result than in bringing to light some isolated facts, yet the taste for such researches exists, and time and labour are employed in looking for the monads of Liebnitz. There is reason to suppose, that some persons soothe their minds with the happy expectation of being able to unravel all the complexities of the creation, by discoveries of this sort. "Abstrahere naturam homines non desinant, donec ad materiam potentialem et informem venturum fuerit; nec rursus secare naturam desinant, donec perventum fuerit ad atomam."*

The boasted excellence of intellect, like every other faculty, must be kept in health and vigour by exercise, in order to prove its superiority over brutes; for even instinct may display powers of intelligence in a degree above the lowest order of intellect. "Brutorum animalium instinctus plura inventa pepererint quam doctorum hominum sermones."†

It must be clear that that omnipotence which can be so prodigal in the exquisite endowments of the animal, for the purpose of its existence, must have afforded to man, into whom he has breathed the breath of life, principles of a much higher order than those required for mere animal life. If every sentiment of the heart, and every effort of the mind, are directed to the object of aggrandisement, how can the intellect soar into the regions of eternal truth? The mind that is not intellectual cannot be supposed to imbibe the pure sentiments and internal convictions of spiritual truths; and he that has read the most intellectual as well as most spiritual work that is extant—the Gospel of St. John, forgets that in treating religion with garish scoffings, he renounces the supposition that intellect is derived from the soul, and he makes a declaration that he places no value upon the highest condition of the mind. "Mirum non utique esse, curriculum non confici, cum homines ad minora deflectant. Metam autem non aliam esse, quam ut genus humanum novis operibus et potestatibus continuo dotetur."*

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* Bacon.

† Ibid.

Science has been compared to a pyramid in structure, because it has a broad base; if so, it should be rather supposed to resemble an inverted one, for out of the first step of science, there springs an endless number of others. The vivifying principle that starts the first germ into existence endues it with an unceasing power of expansion. It is the very quality of science that every step that is made in it must be inceptive of other advances. By the globus intellectualis of Bacon, we may conceive that he imputes to it the power of expanding in every direction. Science begins everywhere, and it ends nowhere. We know that the horizon of the mathematician has no boundaries. The omnipotent Author of the creation has declared that all the works of his hands are verity and judgment*; and this is a postulatum which must be accepted, before any scientific principles can be formed. When nature opens her lap of rich stores to the scrutiny of the philosopher, he finds that there is not a spot to which he can point his stile, in which a truth does not lie concealed, to bring which to light is a germ of science, which will not fail to go on to its full growth under the cultivation of an intellectual mind. All the parts of nature are made one whole by association. "Toutes choses étant causés et causantes, aidées et aidantes, médiatement et immédiatement, et toutes s'entretenant par un lien naturel et invisible, qui lie les plus éloignées et les plus différentes." † If all these relations were fully displayed, we should probably be surprised at the most unaccountable connection in which very different parts are held in correlation.

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* Bacon.

Man is placed in the midst of infinity. He is placed in infinite space—he exists in infinite time.

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* Psalms. † Pascal.

He sees in the construction of diminutive creatures, parts that are infinitively small. He views in the sidereal system, a world of infinite greatness.* Why then should he be always receding to the centre, and contracting the compass of his observations? Why not take the wings of the morning and fly to the uttermost parts? Intellect has the quality of discovering truth; truth is wisdom; and "Wisdom was set up from everlasting, from the beginning, or ever the earth was." "Unto you, O men, she calls, and her voice is to the sons of man."†

I have endeavoured, in carrying on the preceding inquiry, to explain my notions of the quality of science, and of the possibility of applying it strictly to surgery; as I am convinced a Novum Organum is required in this department of knowledge. It must not be supposed that I have diverged from the immediate matter in dilating, to a limited degree, on the application of the mind not strictly included in the subject of surgery. The fact is, that as the qualities of the mind enter into all the affairs of life, it is difficult to define any limits; where circumstances may not bias the intellect in various directions, and shackle its powers.

The following observations have no pretensions for having a systematic character; being merely the cursory notice of views formed in a long practice. The allusions to the cases that are noticed, are not intended to give a full description of them; but to bring the conditions of disease in such relations with each other, that principles of a scientific character may be established.

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* Pascal. † Proverbs.

SURGICAL PRACTICE.

The surgeon has his attention so often directed to cases in which all the conditions of muscular action are required to be understood, that it is necessary he should be acquainted with the more obvious laws that are engaged in developing the powers of this influential agent. The knowledge of these laws will be the basis on which the practitioner has to found his art, in one division of surgery.

The animal body, in reference to its muscular structure, must be considered as a system of moving powers. Like the solar system, each movable part has its own system of muscular actions, adapted for the purposes of its own particular motion; and its own centre of motion, about which the moving powers act. All the minor systems have a defined relation one with another, and also in combination amongst themselves, so that ultimately the whole is collected into one system. This combination of all the systems into one aggregate system has its centre of motion, in relation to which all the movements of the body must be referred. But, as every part, and also every centre of motion of each individual system, are under the influence of gravitation, so no laws can be enunciated respecting the motions of the parts or of the whole, in which the centre of gravity of the animal body is not an essential and primary element.

We have in the animal body as many combinations of movements, at least, as there are parts fitted for motion. But it is not enough that such a number of parts are formed for motion. Every one motion exercises its power for motion over all the other motions, and therefore every motion adds the sway which it exercises over its own dominions, to the quality of the whole.

The subject of association, required in the actions of muscles, has been so little adverted to by physiologists, that some further considerations must be dwelt upon for explaining the aids this doctrine will afford to practical surgery. And it will appear that these aids arise as often from the negation of action, as from the combination of movements.

The human frame is constructed as a self-moving machine. But it is not only gifted with the faculty of moving itself, but also with that of preserving its balance under every contingency, by which the force of gravitation can bring danger to it. It has the faculty of varying its movements in every possible way. If we suppose that a body of the figure of a cube be placed on the earth, that point through which a line from the centre of the earth passes to the centre of gravity of the cube, is a point in the base, which, of all points, is really that alone which can support it, if every other part of the base were removed. This small portion might support the cube, whilst the body was kept quiet and equably poised. But it could not resist shocks, nor the least impression made on it to disturb its equilibrium. The least deviation would make it totter, and overthrow it.

But, for the purposes of existence, we must suppose even a living mass of this shape to be accommodated with muscles, not only to poise itself on the small point, but also to be able to contend with every impulse from without.

It is obvious, from this limited view of the conditions required, that in the multiplicity of changes such a body is exposed to in its movements, the intention cannot be effected by one, or even several agents. Not only are numerous muscles called upon to act, but they are to act by a perfect association and consentaneity of action, in order that the movement may be effected with electrical celerity and undeviating precision. It must be remembered, that in the combination of the moving parts of the machine, the variations that may take place in the least part will vary the whole. The change in the movement of a finger has really and strictly an influence upon the whole body. The most profound wisdom could alone adjust all the complications of the associations required in the movements of the animal machine.

These combined forces, associated for consentaneous action, alive to the impulse which danger, or other circumstances, may excite in the sensorium, must have a centre, around which their exertions are to be employed. Indeed, every movement in the animal body engages a watchful sense for maintaining its equilibrium, as for providing for the requisite precision of action. To preserve this unity of purpose amidst such a complexity of means, there must be a centre of motion, about which all the separate systems are to move. The centre of motion is the centre of gravity. In man the centre of gravity is a movable point, limited in the variation of its position, between the pubis and sacrum. To insure perfect uniformity and combination in the agents of motion in the animal body, there must be the fullest and the nicest intercommunication of the nervous influence, requiring much more complication of qualities than those of mere motion or sensation.

The surgeon is so often called upon to conduct his treatment of cases in reference to muscular action, that it becomes necessary to dwell longer upon this subject. We see enough, wherever muscles are engaged, to know that they are continually varying in their condition as moving powers. We find them in states of transition, either advancing in increase of strength, or receding from their natural standard. They vary and enlarge their associations with other muscles, or they contract and simplify their combinations. Thus we find that old associations of muscular actions are continually being broken up, and that new ones are as often being formed. As almost all muscular actions are performed in reference to a centre, so, when this centre is lost to muscles, as a bond of union of consentaneity, they, if they can find a new centre readily, go into a new combination of action, as conformably as can be with this new centre. This ability to adopt states of transition is, of course, the ability to be educated. There are professors of this class of educations; and if there is one period of life in which mankind submit to it, there is also another period when indolence leaves the human body in the bad habits of awkwardness.

Every joint is evidence, in the ordinary motions that are effected in it by the muscles for this purpose, that these motions can only take place by a combination of the moving powers. It can only be by an association of muscles in their actions, that we can carry food to our mouths, or, that which is much more difficult, can manage to drink. A proof of this association may (as I think) be exhibited in that affection which we call cramp. This is usually a state of muscle arising from either excess or diminution of the quantity of exercise that it is usually accustomed to. Thus, those who take inordinately long walks, or those who by fits take no walks, are subject to it. If cramp occur in one muscle, as in the extensor of a joint, and the flexor of the same joint be put into strong action, the cramp ceases immediately. If the extensor pollicis proprius of the foot (a very common muscle for the occurrence of cramp) be the one affected, it is only to put into action strongly, the flexor pollicis longus, by pressing the toe against some substance, when all cramp at once ceases. These two muscles are associated by reciprocity of action, and as the one motion is strongly called forth, the other gives way to the minimum of action, and thus the cramp is removed by the law of consentaneity existing between all muscles of one joint. The biceps flexor cruris is also a muscle very liable to cramp; by bending the leg on the thigh, and rotating the tibia inwards by means of the inner ham strings, the foot being pressed against some resistance, at once the cramp goes. Rubbing a cramped muscle rather adds to the suffering, and the approximating the attachments, or what is called relaxing the muscle, has no effect at all.

The centre of gravity of the animal body engages the whole muscular system in its service, and directs all its powers for preservation, when the body may be endangered by the force of gravitation, the centre of that system in which we exist. It is probable that, if all the muscles of the body were developed to the utmost powers and associations they are capable of assuming, the body would be most accurately balanced in every possible position; and that even in any slight declension from the due equipoise of the whole, the limbs would be thrown out with accuracy and precision to protect the frame from injury. In such an order of things, not only would the many falls not happen, which are so frequent now, but if they even did occur, the limbs would suffer but little. In animals that move in the atmosphere, there is little doubt but that the centre of gravity in its bearings is equal to a sense in exciting the muscles for instant action. A very little practice would enable a person to calculate the turnings and the risings and declivities of the road in which he travelled, if he were well exercised in the balancing motions, although he might not see the way; so watchful are the muscles in that system of actions for which they are associated, to meet every contingency of change of position in reference to the centre of gravity.

The problem which would assign the influence of health of a person from the conditions of his muscular system, has an extended range for the investigation. The muscular system was constructed for actions and moving powers more numerous and vastly greater than those which are actually presented to us. We never see a man run round a corner at the utmost of his speed, yet his muscular frame is capable of arriving at this power, as well as that of walking in a straight line. And every internal part must be formed to go on in unison with these varieties, in all the exertions and movements that may possibly occur. Every function of life must be influenced by the full and perfect development of muscular motion. Diseased organs, when present, give a character to the movements of the individual in whom they exist. And the converse must be true, that the adoption and perseverance in the exercise and agility of muscular actions, must be best likely to insure health to the internal organs. In the carriage of a person may be seen the nature of his disease, and in his carriage may consist one source of health. Peculiar labours thus give character of diseases to those engaged in them, and transmission will perpetuate the deterioration already begun.

A result of this association of muscles in their actions, is, as far as I conceive, a circumstance of a peculiar interest ; at least, it is a fact directly opposed to the usual reasoning pursued in these cases. It is this,—that as they are combined to act in a given way, so they will not exceed the limits which is set to them by this arrangement of association. Thus in the hip-joint, where there is a complexity of muscles about it, and where there are some that may be supposed to be calculated to draw the femur up, the moment the opposition to this movement may be taken away, yet I believe this retraction would not be the case ; but that it is, on the contrary, an abiding quality to go on acting about their centre of motion, without deviating from that arrangement of action which is implanted in them ; so that, if it were possible to remove the acetabulum without any undue excitement to the muscles, (which excitement indeed happens in dislocations, to be explained in another manner,) then none of the muscles which by their insertions might be thought ready to draw the head of the bone away, would really do so, but that the part would be kept in its ordinary situation under the influence of this combination of active powers.

As a striking instance of the importance of keeping in view the power of the centre of gravity over the muscular mechanism of the human body, and also of the value of investigating the qualities of the associations of muscles, I shall allude to the muscular structure of the lower extremity in a very slight way. The situation of the centre of gravity is placed at a point, the vertical line of which falls between the two lower extremities, and as the whole weight of the body is concentrated in this point, so to prevent its pressing downwards, and forcing its way between the thighs, it is required that there should be powerful muscles, not only to keep the limbs together, but that in progression this weight might be thrown to each side, as the steps are made in advancing. The adductors keep the legs from flying asunder, and preserve the centre of gravity in its changing position. But these are always sufficiently engaged in these great exertions; and there are many and delicate motions required in progression which demand other agents; these are the many small muscles about the joint. But even these would be useless if the insertion of the triceps were carried up close to the joint, as is obvious on inspection. I have drawn the reader's attention to this joint, as he must see, that from the power of these muscles, the constant state of exertion, and from the direction in which these powers are exerted, they must exercise a perpetual force, calculated to throw the femur upwards and outwards, and, in short, to luxate it; the round ligament will hardly serve to prevent this. But there is a more certain power to preserve the joint in its situation, which is, the influence of the association of its moving power. I may make a short remark here, which is, that in stating the way in which the triceps is inserted into the femur, and the insertions of the muscles about the head of the joint, we see that if it were otherwise, the course of the peroneus longus, and the setting on of the tendo Achillis in the way they are arranged, would not be required. The true economy of a part is only got by studying these sorts of relations.

I must now impress upon the reader, that what has been explained as to muscular action, is very much with a view to guide the surgeon in adopting the best positions of the limbs, or of the entire body, in injuries and other states where it is necessary to guard against the interference of muscles, in the course that may be proposed for the line of treatment in any one case. Thus, as all muscles are, for the most part, exercised in the forward movements of the body, and as very few people have much use of the muscles that act in a sideway motion, so when any one muscle is used in this forward motion, there are, by reason of the association of actions, many others called into action; to the injury, probably, of the case. Whereas, when the patient is placed on his side, owing to the disuse of the muscles calculated for this kind of movement, the whole system of muscular actions is more likely to be in repose, and has less chance of being excited by the laws of association.

There is yet another law of muscular action that is to be constantly attended to in practical surgery. It is, that the relaxation of muscles is to be effected by attending to their position when they are required to throw out their strongest exertions; and not, as usually is supposed, by approximating their attachments. It is a fact we might almost expect, as the result of the powerful influence of association under which they act, and which, whilst this combination exists, regulates the exercise of their forces. Thus the powerful gastrocnemius muscle exerts its greatest strength when, in progression, it is acting to advance the body forward, by throwing its weight upon the toes or metatarsal part of the foot. To do this the foot is extended, which is the same thing as approximating the attachments of the muscle. Now, that case which is called dislocation of the foot backwards, and in which the tibia is presenting in front of the astragalus, offers an exemplification of this position. Of course the gastrocnemius has its lever of action increased in power as the foot lies extended, by the heel projecting so much behind, which advantage, joined to that of its habitual exertion when in this direction, forms very great opposition to the foot being brought to a flexed position ; but yet this is not difficult, and the surgeon will sensibly feel the cessation of its action, the moment it is brought to a right angle with the axis of the tibia. This is owing to its being then in a state of least action, in the usual exercise of its powers. Another exemplification is that of the fracture of the humerus just below the attachment of the deltoid muscle. We find, in the first days of this kind of fracture, that owing to the disturbance which the absence of the integrity of the bone gives to all the muscles engaged in moving it, the deltoid will raise the upper portion, and give great appearance of deformity to the limb, and apparently baffle the aim of the surgeon to get a straight union. And this will be the case if he brings the lower portion away from the side of the body to meet in apposition the upper projecting part. Instead of doing this, he has only to take measures that the lower end should hang easily by the side of the patient, and he will find the upper portion fall into the straightest position he could possibly desire. When the upper arm is hanging quietly by the side of the body, then the deltoid is in a state of the least possible action. In this way of reasoning it is that I find this fracture unite in a remarkably straight form. Upon the principle of relaxing muscles by approximating their attachments, the very reverse practice to this would be adopted, which is, the raising the arm to the level of the acromion; this I have seen done in such cases, but most fruitlessly.

There is another law of conditions under which muscles act, which is of the utmost consequence to the surgeon. It is this which explains in my mind the difference in the characters of luxations, in reference to the facility or difficulty of reduction. This law is, perhaps, a corollary following that principle which requires the necessity of association in the actions of muscles. What I allude to is, the overpowering strength which a muscle is brought to exert, when its usual direction of action about a centre is forcibly changed. I think the best exemplification of this is, in that case of rare occurrence, the dislocation of the patella on its edge. When the patella is displaced in this way, it sets into action of the most violent kind, those muscles which are the extensors of the leg. Their force is the effect, first, of that irritation which all muscles get when they are thrown out of their ordinary line of action, particularly when they are disturbed in moving round their ordinary axis or centre of motion; but still further, because, when these muscles are called upon, they act most powerfully, or, in other words, they are in the strongest action when the limb is to be straightened, as they are then to balance and support the whole weight of the body, by making a firm pillar of the extremity. Thus in this condition these muscles act with a power that defies all the force that human aid can call into its service. I have seen the utmost exertion quite feeble in changing, in the slightest degree, the state the bone was in. Yet we know that in instances where one individual puts forth his whole power in muscular action, he cannot resist the strength of two or more to overcome this power, as is often seen in trials of a clenched fist, &c. The power of many men is not equal to the force of muscles in dislocations. But, nevertheless, the purpose is readily effected, if we avail ourselves of the fact that these muscles only act so powerfully when in this position, which is that they have when they usually exert their greatest efforts, that is, in the state of extension of the limb. So we have only to flex the leg a little, and all this powerful opposition to restoring the patella ceases upon using the slightest rotatory motion, and it readily falls into its place. This law of muscular action explains the great difference we find in the opposition offered to the manipulations we adopt in various dislocations.

It does not enter into any part of the design of these observations, to discuss a question of nervous functions; but it must be apparent, that if we stop at the point at which it is declared that one set of nerves is appropriated to sensation, and another set to motion, we advance very little to settle many points in pathology. We cannot assign the laws of even one muscle without having some proof that a most intimate association and communication of nervous influence is called for, and to a degree that is beyond all conception in the promptitude and certainty of the power they exert. No part of the animal economy abounds with more evidence of the wonders of adaptation.

I feel that it cannot be too much insisted upon, that muscles, the agents of motion, whilst they act under given associations, may even then fluctuate, or pass into transitional states, if not steadily called upon for the same exercise of their functions. They may increase in power, or they may fall off in strength; but if they have lost the association under which they have been accustomed to act, then they readily assume new associations, and combine to execute new actions under the new arrangement:

so that bones that have been long dislocated are made to acquire the power of executing motions that are substitutes for the natural ones. That power which so beautifully maintains the elaborate associations in movements, is the power also of preserving these necessary functions under obstructions.

Habit must be included in the elements that are required for the purpose of arriving at pathological principles, particularly regarding muscular action. It often deranges the order of nature, and is a quality that exercises a large dominion over the condition of mankind. Habit includes the changes that are imposed on the frame by different occupations; and the continuation of the peculiarities which habit has raised into existence, is proved by the division of the human race into its various differences.

Another important character that I have observed in the animal economy, and which is so prevalent, and so often required to be taken as an element in pathological inquiries, that it may be taken as a law, is that power which can set aside the ordinary laws of matter. We find the principles of hydrostatics have little to do in influencing the circulation. We are willing to attribute some effect of gravitation in the veins of the leg in the erect position, but this is by no means equal to that which might be calculated upon, although the pressure is only as the square root of the height. I have often had cases of openings made from the urethra into the perineum, but have seen the patients pass their water without a drop passing through, which is contrary to the laws of hydraulics. We have constantly, after the operation of lithotomy, the opportunity of seeing the water ceasing to pass through the wound long before this has healed. But the most satisfactory evidence will be found in the way which a patient gets rid of a body that has passed into the trachea; it is not by hanging with his head downwards, but by sitting up, as all people, I believe, do, when they have to expectorate mucus. If the body is movable, it may certainly be placed in that condition for a speedy relief of it, without the occasion of opening into the patient's trachea.

By health we understand the orderly and complete manner in which the animal functions are carried on. But health is not an aggregation of the same terms of existence in all, so that even health has its individuality in each being. Yet, in all the varieties of robust or weak structure, when parts are injured or deranged, we see the power of conservancy engaged in setting up the actions for repair.

It seems to be received in physiology as a fact, that there is a continual mutation going on in the animal body. That there is a removal of one set of particles, and a deposition of another set of particles, and yet that the true model of the original remains perfectly unchanged; and this mutation is effected by no obvious alteration; but is steady in its course, undeviating in fulfilling its purpose, and defined clearly in its limits. All this implies a conservative principle that preserves the whole, and keeps in orderly action all the parts of the entire system. As this transitional state is going on, while the whole system apparently remains the same, so must all the parts of the system concur in the influence that is to regulate the whole, and there must be a principle of conservancy peculiar to every part, as well as to the system at large; a principle not only maintaining the body in its original condition, but giving it the power of rectifying derangements in its state. A local disturbance will thus impart a disturbance to the whole. The whole, when perfect, is the orderly proceedings of all the parts; and for this there must be an association in all the parts, to act in unity with the whole.

This power of conservancy is equable and unobtrusive in the influence it exerts, and imperceptibly carries on the preservation of our existence. But the operations of external agencies are continually interfering with the orderly proceeding of this power, and invade the integrity of parts, and eventually of the whole system. The disturbance which an injury has produced becomes, by the principle of accommodation, an excitement to set up those actions which are required for the repair of the injured part.

We call the agent that acts on living structures, so as to induce some change, stimulus; and it implies a quality in them responsive to its influence. The injuries that are produced upon the living structures become often the stimulus for exciting those actions which are calculated to repair the hurt. The process for repairing a broken bone arises out of the injury that the bone has suffered. Stimulus is so much an element in surgical pathology, that every investigation that can settle any of its laws, must be exceedingly desirable. The simplest action that a stimulus may excite on a part is that of producing a process for immediate relief. This of course implies a conformity in the part acted upon to receive an impression that will not go further than to effect this relief. But even a stimulus that would induce only processes for relief, may require more elaborate actions for this purpose, owing to the want of this conformity; and further, the stimulus may cause destruction, without exciting any series of actions for repairing the mischief.

The influence of conservancy seems to be a power always acting upon structures to preserve their functions; and the importance of functions gives the degree of energy in the reparation of structures. Surgeons have puzzled their brains as to the best means of keeping the parts of a wound of the tongue together, whether by stitches, &c. The fact is, all meddling does harm. If the patient will keep the tongue quiet at the bottom of his mouth, the wound will heal, as I have seen, better than any thing his busy hand can do to effect it.

It is said that there are five special senses; but it appears to me that every part is endowed with the nervous influence for its own especial functions, and for the maintenance of that integrity of the structure of parts which is necessary for the exercise of functions.

We see such exquisite adaptation in the lachrymal appendages, that the exercise of their functions is carried on without exciting the least sensation. If a particle of dust be blown upon the eye, which particle is of form and size to give the sensation of its presence under the lid, and the eyelids be not rubbed, then, although it may give pain, this soon goes off, and the patient is no longer aware of its presence. The particle has lodged under the tarsal edge, and becoming quickly enveloped with the secretion of the glands there, is no longer an irritant, nor does it excite any feeling. It is, indeed, in the condition of the natural secretions of the part, and, therefore, it may be present without impressing the sensations. But, nevertheless, it is a stimulus, although insensibly so to the part, to excite that process which quietly removes the particle from under the lid, and completely ejects it.

But in the same case, if the eye be rubbed, then the particle, instead of remaining at the edge of the lid and getting a coat of mucus quickly, so as to be quietly removed, is, by the act of rubbing, which excites the orbicularis to retain it, carried further under the lid, where it not only excites a painful sensation, but keeps up the irritation it produces, a considerable time; indeed, until it is clothed with mucus, which is now a longer process to go through than in the other case. But here again, when the particle is so coated all pain ceases, and it remains unfelt till it is expelled. These cases are both instances of the stimulus, acting with a little difference, as stimuli for relief.

The practice of surgery is much exercised in the full consideration of stimuli, in reference to the powers they excite for the relief of the disturbance they produce, either in the simplest degree, or in the most complicate order. The influence of stimuli is for the most part conservative. If the hand be exposed to labour, the cuticle hardens; the conservative influence is seen in the simplest degree. But if this be carried on with increased intensity, or in longer duration, a greater derangement follows; blisters are formed. But even this degree of stimulus brings with it the conservative action, if left quietly to carry on the necessary process. The part stimulated must have a power of responding conformably to the strength of the stimulus, otherwise the stimulus is destructive. In a paralytic subject the stimulus of pressure is beyond the power of the integuments to resist by any action of relief. The surgeon is continually called upon to calculate those forces by which injuries are produced; but he is also required to estimate with precision the degree of influence of the stimuli he employs, by the application of which he intends to call forth those living functions, which are to carry on the processes of repair.

Having sketched this short outline of some propositions which may be regarded as preliminaries to practical surgery, I shall now offer my views on the treatment of several cases.

It is proper that some definite meaning should be applied to the acceptation of the term dislocation, in the following observations. I do not mean by this word that violence by which the bones of a joint are forcibly driven out of their proper position. This case includes a crushing of the bones, or complication of violent impressions on the part, that clearly endanger the continuance of the structure, as a joint. What I do mean, is that injury which results from some force so applied, as by giving an irregular centre or axis of motion to the bone luxated, to turn it out of the socket; and which usually permits of its being returned, and of its resuming the functions that it previously had of a joint. In this class of cases the muscles have generally the great share in the occurrence of the luxation, and they have a proportionate influence in the processes calculated to effect the reduction.

The dislocation of the humerus being one of the most common, the consideration of it offers the best means of a clear exposition of those conditions under which luxations usually take place. In this joint, which is what is called ball and socket, all the movements of the limb are regulated around a centre, which is nearly the centre of the head of the bone. Whilst the muscles can direct all their actions around this centre, no ordinary force can displace the bone; but if a force changes this orderly course of action by another power, acting upon the bone under another axis of motion, then the head is thrown out of its socket. The bone is dislocated. In the situation in which a person is when falling, the first impulse involuntarily impels him to throw out his arm in an extended state to break the fall, and to save his body from injury; it is necessary for this end, that those muscles which usually draw the arm to the side should be put into powerful action, which has the effect of changing the centre of motion from the joint, to the axis of motion at the point where these muscles, chiefly the pectoralis major and the latissimus dorsi are inserted, which is a place below the joint. Thus the limb forms a lever of the first kind, the weight of the body coming upon the hand is the moving power, the point of insertion of these two muscles is the axis, and the power of retaining the head of the bone is the obstacle to be overcome. The head is in this manner tilted out of the socket. The direction in which the head of the bone is thrown will vary as the arm is forward or backward, in reference to the lateral line of the trunk at the time when the person falls. (*Fig.* 1.)

The derangement in which the parts of the joint are now placed, clearly shows the features of the case. The head being removed into the axilla, the distance between the acromion and the external condyle is increased. The deltoid muscle has lost its usual centre of motion, and is therefore strongly excited to inordinate action. The same altered state of the centre of motion and derangement of the associated actions influence the other muscles, and thus there is a combination of powers calculated to resist the restoration of the head. The arm is poised in its position, with the centre of motion removed from its proper place; so that we readily recognise, in the condition of the parts, the character of the dislocation: the elongation of the arm and the new centre of motion for the muscles, when they do act, explain the reason of the appearances. The head, when the limb is moved, now is carried about a new centre, and therefore presses most painfully on the parts it encounters. The increased length of the arm should be borne in mind, as in fat subjects it may be the most unequivocal sign of the nature of the accident. The next useful mark is the power of increasing the vacuity under the acromion, by raising the head of the bone. In the natural position, if the arm be elevated, the space between the acromion and humerus is lessened; but if the head be in the axilla, it is increased.

It might reasonably be supposed that the exigencies for reducing a dislocation would be those that resemble, only in a reversed order, the steps by which the injury was produced. But the surgeon has to encounter the most strenuous opposition from powers that may, without management, baffle his strength to overcome them. It is a business in which muscles are both his opponents and his coadjutors.

I wish to correct a notion which surgeons seem to have, that when a powerful traction is made upon a luxated limb, the direction of the traction may be changed by making some forcible pressure at right angles to it, so as to lift, as they call it, the head into the socket. The laws of motion show that this cannot be done, except by a power little less than that laid upon the line of traction. I have often seen this lifting of the bone attempted, but only to prove the impossibility of accomplishing it. But what these irregular mechanical means are powerless to effect, the muscles of the part most readily accomplish. The fact is, that the surgeon does not complete the reduction of recent luxations. The bone is kept in the displaced position by the inordinate action of muscles, excited by the derangement in their associated mode of action. If the surgeon can, by his manipulation, bring the displaced head so near the socket, that a proximity to the wonted centre of action is obtained, not only do the opposing forces cease, but all the muscles that remain unhurt conspire consentaneously and violently to draw the bone to its place. The final act in the reduction into the joint is to restore the length of the limb to its proper state, that is, to shorten it; so the last effort for reduction is a motion contrary to that which the surgeon is making in his traction; and he is made sensible of this sudden retreat of the bone, although he is keeping up the full force of his traction. His efforts are limited to that of drawing the bone so near to the glenoid cavity, as to bring the muscles into a situation to resume that association in which all their actions have been accustomed to take place.

This explanation of the combination in the action of the muscles, by which the completion of the reduction is effected, accounts for the distinction between the recent and the old dislocation. In the former, the muscles finally accomplish the purpose which the operator cannot fully complete;

in the latter, the operator must adopt measures which are to supply this defect in the assistance of muscular action.

There are many opinions respecting the direction in which the traction should be carried on. It may be assumed that luxations generally should be treated in a way that would seem to reverse the steps by which they were produced. With this view the bone should be drawn in the direction in which, when displaced, it lies. But it must be remembered, that the resistance is really owing to the loss of that combination of action which is required in the muscles, arising from their being deprived of that centre around which they act; and the object to be aimed at, is to bring, as perfectly as can be, the head into that situation in which they can all, with one consentaneous act, draw the bone into its place in the socket. I believe that even in recent luxations, the traction should be not from one fixed point, but from a moveable one, so as to allow of change of direction.

The numerous cases of this kind that are brought to St. Bartholomew's Hospital are for the most part reduced by means of the heel in the axilla; which, in fact, applies the traction in the best direction, outwards and downwards; inasmuch as whilst the limb is drawn downwards, the foot pushes the head outwards, and thus the traction is oblique in its direction; it has this advantage, that the foot, by pressing on the inferior costa of the scapula, fixes this bone tolerably well. Probably by increasing the width of the foot, and so making the outward pressure greater, few dislocations would resist this way of reduction.

This observation leads to the subject of long-standing luxations. Some years ago, a patient was brought from the country into St. Bartholomew's Hospital, who had a dislocation of the thigh of some weeks' duration. The first surgeon who saw him had not detected the luxation. After some weeks a second surgeon saw him, and at once knew what had happened. He adopted the usual means for reduction without success. The patient was then, at the end of six weeks, sent to London. I adopted the usual plan of extension from a fixed point, and readily brought the head to the natural range of the joint; but no contrivance could shoot the head of the femur into the acetabulum. I was not contented with one trial; I failed in at least three. This occurrence led me to reflect on the principles on which the treatment of dislocations rest. I am now convinced, that in recent luxations there is a power independent of the operator, which can, in spite of the force he employs, and in opposition to the direction of it, thrust the bone into its place; so that it is really the absence of this power of muscles, that is the reason why old luxations of this sort are not reduced in the way the operation is usually conducted.

I have said much of the system of motions that arise out of the combinations of muscles acting by consent, in relation to a centre of motion. This consentaneity of action is not only persistant and complete, whilst the muscles have this centre about which to act; but the moment they lose this centre, the association of actions is broken up, and new associations are begun to be formed, under new conditions. Thus in luxations of six weeks' standing we find nothing of that assistance which the muscles combine (in recent cases) to place in the service of the operator : in vain he makes his extension day after day, and fails if he conducts the traction from a fixed point. He must now make his extension from a moveable point, that may be capable of changing its place in a circuit of considerable amplitude.

A case presented itself to me in which the humerus had been luxated seven weeks, extension was conducted in the usual way for a long time, and with the fullest force, and no reduction resulted. I then drew the limb across the chest obliquely, and by this means returned the head of the bone into the glenoid cavity with very little effort. A maid-servant fell down stairs and injured her shoulder; a practitioner living near was sent for, who was not aware it was a luxation. The mistress sent her to me at the end of six weeks; I saw the nature of the case, and took her to the hospital. I first tried the usual plan in vain; I then placed a thick body just in front of the axilla; and by first drawing the arm down, and then carrying it across the chest over the body, the bone slipped easily into its place. The perfect use of the limb was ultimately recovered. Thus it is not by the force of extension, but by the adaptation of appropriate manipulation, that old cases are to be reduced.

The bone is easily replaced, and as easily put out again, so that a long observance of immobility must be insisted upon after the reduction, before the limb will become quite restored. Of course there is a limitation to the period of the propriety of trying reduction in old cases, as the power of accommodation is so unfailing, that changes too great may occur, after much time, to justify the interfering with this settled order of things.

I consider that it is highly proper for the security of the joint, that the limb, after a luxation, should be kept at rest some weeks. A brewer's man was brought to St. Bartholomew's Hospital, with a luxation at one hip, and at one shoulder. He was kept in bed a month after the reduction, but allowed to move his arm. When he left, he felt nothing of the hip, but he suffered pain in his shoulder. A female, of the order of fish-women, was brought to the hospital with dislocation of the shoulder; the bone was reduced; and she chose to go out, and immediately resume her occupation of carrying a basket on her head. The dislocation very soon recurred, and again and again she applied at the hospital for the same purpose, it slipped out so readily. But as the old method of mere traction was employed it became more difficult to effect the reduction, so much so that at last she had to stay in the hospital some days before it could be accomplished.

In forming a diagnosis of luxation at the shoulder, the increase of length between the acromion and the external condyle of the humerus must be accurately ascertained. If there is swelling, in doing this some allowance must be made for the effect it produces. This sign of course refers to the case of the head being in the axilla. A gentleman fell and injured his shoulder : he persisted to me that he had only a severe bruise. On examination, I found little difference in the rotundity of the two shoulders, and the elbow did not project from his side, for his fat side met his elbow. I measured the arms, and found the limb lengthened. I was convinced that the bone was displaced, and that there was not a fracture of the neck, or of any part of the scapula. With difficulty in getting his permission, I was allowed to adopt measures for reduction, and happily soon felt the bone slip into its place. The patient then concurred in the opinion of the arm having been luxated, as his feelings were so much improved by the reduction. Another case occurred to me in a lusty person, who was a medical man. The shoulder had suffered luxation twenty-four hours before he sent for me; and he insisted upon the fact, that the bone was not out, and resisted the trial for reduction. I refused to leave his house till I had done my duty as a surgeon; and convinced him I was right by quickly reducing the bone. It was the measurement of the length that convinced me.

It may be perhaps inferred from my omission in alluding to them, that I place little reliance on the efficacy of what are called constitutional means. I have seen a patient almost bled to death, and with no effect in facilitating the re-

reduction of the luxation; and I have also known the administration of full doses of tartar emetic without exciting nausea, and not at all administering aid to reduction. The warm bath likewise has been valueless in my experience. I need not say that in old dislocations these expedients are quite nugatory.

In those falls which old people are exposed to, so that the whole force of the violence is received laterally upon the upper part of the humerus, the blow is expended upon the glenoid cavity of the scapula, or on its neck. The latter fracture has been denied by some surgeons who have been inquisitive to detect it. In this way, however, certainly some fractures may take place at this part of the scapula, presenting the sign of a falling of the limb, and of crepitus on placing the thumb on the corocoid process. These cases occur generally in old persons, and usually do well; leaving the powers of the joint but little impaired. The treatment is simply preserving rest, and proper position.

I have had several cases of fracture of different parts of the scapula: the most common is that of the inferior angle, and of some part of the spine of the bone. All these fractures are exceedingly painful for the first week or ten days. This may be accounted for by the injury being produced by direct violence, with consequent contusion of muscular fibres, which is always attended by great pain. These cases require no bandages, indeed a bandage only adds to the pain. The parts have nothing to prevent their remaining in quiet apposition. The pain soon goes off, and the patient then finds himself well: recumbency in bed is absolutely necessary. The fracture of the acromium is a more rare accident than that of the other parts of the scapula, but equally painful; no bandage is required; repose in bed with the arm to the side, by which all the muscles will be in the greatest state of quietude, is all that is required.

Every now and then I have had cases of fractures of the anatomical neck of the humerus. They have always been in young subjects, and I believe they are cases of separation of the epiphysis. When the arm is quietly reposing at the side of the patient, the only muscles likely to be in moderate action are the four muscles inserted into the tuberosities of the humerus, and they probably cause the alteration which takes place on union of the fracture, which is, that these processes are brought higher, and a little more forward than usual. This causes very slight shortening of the arm; but the limb is restored to as useful a state as the other arm. I have lately had a case under my care, where the appearances, after twenty-one weeks from the accident, were apparently fracture of the clavicle near the acromion, the head of the humerus being pushed back, and placed in a position with the upper end pressed on that part of the spine where it terminates in the acromion, and the posterior part on the external side of the inferior costa. This case seemed to simulate, at first view, a luxation of the head of the bone on the dorsum of the scapula.

I have already explained the way in which fractures of the shaft of the humerus are to be treated. By letting the upper arm lie quietly by the side of the trunk, and allowing it to take this position as free as possible from all encumbrances, it will unite perfectly straight, and soundly. This bone, as in the case of all fractures, should be relieved of all apparatus the moment it is firm in its union.

We have many cases of that injury in which the epiphysis of the lower part of the humerus is separated from the shaft. This accident simulates, at first view, dislocation, but is easily discriminated by keeping the attention fixed to the radial joint with the humerus. These cases occur, of course, in children, and in very young ones as far as I have noticed, and therefore give trouble in the treatment, as more restraint over muscles is necessary at very early ages. The attention is required to secure the union to take place in a straight line. The treatment must be conducted upon the principles I have laid down, as far as the necessary restraint will permit.

I have had many cases in children also, but of rather greater ages, of separation of the condyles. It seems that the one condyle indifferently may be detached from the shaft of the bone to which the other remains duly attached. It is here also that the radial part of the joint will detect which condyle is broken from the shaft. In either case the treatment is the same; it is to procure quietness. The best apparatus is that of only two splints on either side of the forearm, to prevent this part of the limb dragging on the broken part, and to keep the radius parallel, and above the ulna; of course, a sling is proper. I regard one caution very necessary in this case, and that is, not to allow any motion in the joint until the bones are perfectly united. I consider what is called passive motion, worse than useless. If motion is adopted too early, it excites a process to be set up of thickening about the joint, which increases the limitation of motion. The arm should be kept quiet, until it can be moved without the least uneasiness.

The cases of luxation of the elbow-joint are, for the most part, those where both bones are thrown either backwards, internally, or externally.

But in these three luxations of the elbow, the joint being hinge-like, and the mode of action being on an axis, this derangement produced by the luxation hardly amounts to a disturbance of the associated action of the muscles about the axis. If the luxation is outwards or inwards, they still are left to act upon the same axis, only a little more laterally than before: if backwards, still the axis is only a little more forwards than usual; thus the muscles offer only a very slight hinderance to reduction. The principles before insisted upon, are borne out practically by the manipulation required for reduction. The limb usually presents itself with the fore-arm semiflexed upon the upper arm. The principal point is to fix firmly the upper arm, and the operator has only to draw gently the fore-arm forwards, and bend it, at the same time pressing laterally on the parts dislocated, and the bones will be easily restored to their proper place. The triceps, only slightly disturbed by losing its ordinary course of action, keeps the arm somewhat extended, and poised between it and the brachiæus and biceps; but as the arm is being bent, its action becomes lessened to the least degree, and the two other muscles increase their power upon the bones, so as to draw them into their position. The brachiæus may be ruptured in the backward luxation. If the operator attends to what is going on, he will distinctly feel the effort of the triceps to diminish, and that of the biceps to increase, as he bends the arm.

These cases exemplify the position I have laid down, that the resistance of muscles in dislocations is in proportion to the distance at which they are removed when acting, from their appointed centre of action. In these three dislocations their direction of action is but little different from that of the sound joint, and therefore they offer comparatively little resistance. The most so, when they are forced backwards, as the triceps is then drawn out of its proper direction; but as this muscle becomes quiescent in proportion as the arm is bent, so it yields readily then, instead of acting more forcibly, as is the usual opinion.

Occasionally, but yet rarely, we have had cases of that luxation of the radius where this bone is thrown up on the humerus, or luxation forwards, as it is called. This is an accident in the production of which the muscles have but little influence; they are therefore as little concerned in the method of conducting the reduction. The most obvious method seems to be to apply pressure on the head of the bone in the proper direction, whilst the joint is kept under the three ordinary ways of movement, for which its structure is adapted. Although I am not aware of having ever had to treat a case of recent luxation of the head of the radius backwards, yet I have occasionally had old cases of this sort at the hospital. I suspect that the nature of the injury is overlooked at the time of occurrence. The bone is thrown behind, and rather beneath the external condyle, not entirely, but sufficiently so for the surgeon to feel its articulating end, and to be able to rotate the arm upon it. The limitations of extension, flexion, and rotation are not great, and become by time much less, so that the arm is ultimately not very defective. It behoves the surgeon to be most scrutinising in examining injuries of the elbow-joint, lest this derangement should escape detection. I conceive the method of reduction to be the same as alluded to in the last luxation spoken of.

There are two cases of what are called fracture of the olecranon. The one, where the fracture takes place about the middle of the semilunar notch: usually this offers a complete separation of the part, to be clearly felt. I always treat this case by perfect extension, which places the olecranon completely in its fossa. In this position the broken parts of the bone are made to press closely and strongly on each other, and to assume the most perfect adaptation; at the same time, as the arm is in one of its natural states, there does not seem to be cause for exciting any undue action of muscles. The result of the treatment is not to leave any inequality in the union of the parts; and this is an injury that does not deteriorate the arm at all. I have never seen any of that imperfection arise that is commonly alluded to, as causing some unevenness in the way in which the bone unites. All the motions are ultimately restored. The other fracture, which has sometimes the term given to it, of fracture of the olecranon, is, where the fracture takes place just at the root of the coronoid process. In this case there is very little displacement; both the external lateral ligament and the anconeus muscle being calculated to prevent the parts from separating much. This accident is accompanied with more pain than the other; it also leaves ultimately some imperfection in the joint. It always occurs from some force applied to the part, as far as I have seen, by a sharp body, and I have often found the bone broken, with a small piece loose, which may account for the imperfection that has remained. Although the treatment is by keeping the arm extended, I am not fully impressed with the advantage of it over that of simply leaving the arm in a state of quietude, in the bent position.

It might be supposed that little new can be offered respecting fractures of the bones of the fore-arm. I have, however, two observations to make; the one is, that I have seen the greatest mischief arise from using bandages in this injury particularly, as, indeed, on very many other occasions. The broken parts of the two bones having been pressed together, and so united, that the limb has been made almost useless. All that is required are two splints, one on the inner and one on the outer side; but then, the chief thing to be observed, and which is very important, is, that the thumb should be kept quite vertical to the little finger: by this means the two bones are preserved in a parallel position, and the muscles in the interosseous space, both before and behind, have the best position for repose, and for the avoidance of pressure.

There is one sort of fracture of the radius that requires particular notice. In falls the hand is put out naturally to receive the shock: as this is done in relation to its position with the body, so the injury may be transmitted either to the shoulder, or to other parts. But it often happens that the impetus is impressed on the ball of the thumb or extremity of the radius: this produces a fracture of the lower end of the radius in an oblique direction, commencing just about the styloid process, and extending inwards to the joint. This is a very painful injury, and not readily to be detected by any thing like a crepitus. In general, the hand drops downward, in respect of the natural state of the fore-arm. This fracture unites as readily as others, but it leaves great want of power to use the hand, and very often much pain. Now I attribute these untoward states to the mischief so commonly produced where bandaging is adopted. If pressure be made use of, it is on that part of the radius where both the flexor and extensor tendons pass in grooves, in the lower end of the bone. They are involved in the slight inflammation and effusion of lymph consequent to this injury, and only require the injurious influence of pressure to become adherent to the surrounding parts, and then they are made useless in their functions; and probably the nerves going to the hand have the same cause for being affected. The apparatus that may be employed in this fracture should be so adjusted as to make no pressure over the broken parts of the radius. After a long time the hand is restored to its uses. I have observed a great proportion of women amongst those who apply with this injury.

Occasionally luxations at the wrist-joint present themselves. I believe the most common form to be that in which the carpal bones are thrown backwards. The carpal flexors are put into strong action in falling, as naturally must be the case, when the palm is downwards, so that any force coming upon the carpal bones nearer the joint than the insertion of the flexor muscles, would force this part of the joint backwards. The displacement is not great, and there is very little derangement in the way the muscles are associated, so that they offer no obstacle to reduction. This is so easily done, that the parts often fall into their position before the surgeon sees the case. The importance of the case rests upon the necessity of keeping, for a long time, the joint motionless. This luxation may occur, and the lateral ligaments not be ruptured; in which case there will be more difficulty in reducing the parts. This is to be effected by bending the carpus, and applying the power at right angles to the axis of the radius.

There is much similitude in the luxations of the wrist to those of the phalanges of the fingers and the toes. In falls the flexor tendons of the fingers are in strong action, and give a direction to the force applied to the extremities of the bones. The chief obstacle to reduction is in the lateral ligaments, as these usually remain entire; but, of course, are changed in their direction. Thus, as the muscles then offer next to no resistance, no effort is required to meet their opposition; and as the direction of the lateral ligaments is changed, extension in the axis of the bones is of no use. If the lateral ligaments are entire, the phalanx that is dislocated lies over and parallel to the other, and the lateral ligaments are now at right angles, instead of being in the same line as the bones, and, therefore, by the laws established in the resolution of forces, any power to draw the bone in the line of its axis must only press the bones more closely together. The phalanx must be first drawn at right angles over the upper bone, and then pressed laterally, so that the end may be placed over the fixed bone, and then turned upon this point into its place. This first cross-position must sometimes be made in the direction contrary to that of placing it over the end of the other, and then brought into the straight line. In these joints the muscles will occasionally, when they are moved out of their proper direction, also cause a powerful opposition.

As explained on other occasions, the giving a rotatory motion to the bone will be the best way of overcoming this kind of opposition.

The first phalanx has not a strictly ginglymoid connection with the metacarpal bones. All the other joints of the phalanges are strictly so formed. Some years ago, a patient was brought to the hospital with a luxation of the first phalanx of the second toe upon the metatarsal bone ; a very long and powerful extension had been made, and without any impression upon the displaced bone. I bent this phalanx at right angles to the other bone, and with one finger pressed the projecting end downwards, and then made the other end revolve, so as to make a straight line with the fixed bone. Thus, without any pain, and with the utmost facility, the reduction was effected. I was standing in the quadrangle of the hospital, when I saw a student fall upon one hand. I immediately examined it, and found the last phalanx of the thumb was dislocated, the bone lying on the dorsum of the other phalanx. I brought the luxated bone down at right angles over the other, and pushing it towards the palm at the same time that I extended it lengthwise, reduced it with perfect ease, and without pain. But a phalanx may be dislocated backwards by a force in another direction, that is, where it is applied, at right angles, to the bone that is luxated, and in this way displace it backwards, still allowing it to be parallel with the upper bone. This kind of luxation requires a different method for reducing it. The bone is to be drawn a little backwards, and then the end is to be pressed over the surface of the upper bone, when it will resume its proper place. In each of these ways, by which the dislocation is produced, the same state of things exists; so that, by making mere extension in the axis of the bone luxated, the power employed is chiefly expended in clasping the two bones together, which may be felt by the operator, if he attends to the sensation he receives in the operation. (*See fig.* 2.)

Luxations of the clavicles are nearly equal in number at each end of the bone. These are cases in which muscles have much to do in the treatment; and this consists in placing the parts in such a position, that the muscles concerned may be sustained in their ordinary state of association, and in which they are best disposed to repose in quietude. My practice is to avoid all bandages, which, by constraining muscles, only excite them to undue action. All I do is, to place the patient on his back on a flat bed, and the bones immediately recede into their proper position, and uninterruptedly are kept so. By keeping the patient thus placed, he in a short time gets well. The arms should be kept as quiet as possible. The displacement at the acronial end is less than that at the other when luxated, because it is retained nearly in its place by the trapezoid and conoid ligaments. This case requires less attention and time than that of the sternal end, where much more quietude, and of a longer duration, is necessary. The principle upon which this method is adopted, is that of keeping the muscles in their natural order, and power of acting. Fractures of the clavicle occasionally occur so near the acromial joint, that it is difficult to determine whether they are not luxations; as the corocoid ligaments keep the parts from separating. I treat all the fractures of the clavicle by merely placing the patients on flat beds; by which the parts assume and preserve their natural position. Bandages seem to do little good commonly, and are not required if the patient keep his bed. This is a bone that quickly unites, and therefore the patients are soon relieved from this awkward position. A cabman was brought to the hospital, who had been jerked from his seat in turning a corner, and had both his clavicles broken in about the middle part of them. I merely placed him on a flat bed, and in three weeks both bones were perfectly united, and without deformity, although there had been considerable displacement at first.

Infants are frequently brought to us, in whom, by some accident, the clavicle has been only bent, and not completely separated by fracture. This bone suffers in very young children readily, when they fall from small heights, as from the mother's lap; and the injury is very often not adverted to, being only discovered after a few days, as the mother is dressing the child. The best bandage is a handkerchief bound round in a figure of eight form, and a sling: the deformity, if any, soon disappears.

The construction of the joint of the lower jaw is peculiar, as the motion of the bone is not about a centre or axis in the joint; but the axis of motion is in a line passing through either ramus, so that the condyles are allowed to move forwards or backwards upon this axis by means of the interarticular cartilage. The luxation is produced by muscular action, and in the open state of the mouth the external pterygoid muscle may start the condyles more forward, and thus place them under the zygoma. The indication is the finding the condyles anterior to their proper position. Almost every face lessens in breadth from the ear forwards; therefore the condyles are found projecting in a position anterior to that they have properly. The circumstance of the displacement acts upon the strong muscles of the temporal and the masseter to excite them to act inordinately, and sometimes very powerfully. The important point to be observed in the process for reduction is, to insure a steady and fixed position of the head; for want of this precaution, I have seen a patient drawn about a room in the management of the manipulation. The head should be placed firmly against the wall, and the direction of the force should be to move the bone about its own regular axis; that is, to press the condyle downwards and backwards, at the same time that the angle is brought forwards. I think these cases occur more usually when both sides are dislocated, than when only one is displaced. Of course, the necessary association of the muscles of deglutition is broken up, and thus swallowing is prevented. The pressure on the parotid gland is also calculated to increase the quantity of saliva.

Many cases of fracture of the lower jaw occur in hospital practice. We must bear in mind, in reference to this bone, that it is highly organised, and therefore its powers of reparation are very great. We find, on this account, that it unites quickly, and that the deformities left are often completely removed; also, in necrosis, the part readily exfoliates. That part of the lower jaw which is most commonly broken (where the force is applied so as not necessarily to cause it to break in one particular spot) is usually at one of the cuspidati teeth, as the jaw is weaker at this part than elsewhere, owing to the tooth sinking deeper into it. As the muscles for closing the jaw are inserted into the posterior part, and those for opening it into the anterior part, so if the head is kept up and the jaws closed, there is a constant effort made in swallowing to separate the portions of the fracture. I have seen many contrivances for keeping the parts in coaptation, some having all the merit of the thumb-screws for producing pain, but they were perfectly worthless for the purpose for which they were designed. In short, I have seen but little done in this way by any bandage. The obvious method is to keep the patient's chin upon his chest, when the muscles will get quite passive, and will then in the least possible way displace the bones. The bed is the proper place to carry out this measure.

The only muscular derangement in the neck that

I have seen as strictly causing wry-neck, is, when the strong sheath formed by the deep cervical fasciæ, to enclose the sterno-cleido-mastoid muscle has been defective so as to allow the muscle, when in action, to draw the mastoid process over the sterno-clavicular joint. All other cases have usually been those of some thickening about the vertebræ.

The very numerous cases of broken ribs which a large hospital produces, of course afford means of drawing inferences of a practical advantage in those cases. The frequency of the injury, and the readiness with which the union takes place, make surgeons leave these cases to a matter-of-course treatment, and do not view them as of importance, where the bone is simply broken. The occurrence of the fracture at or near the angle is not so common as in a more anterior situation; but this seat of injury at the angle gives more pain, and is less obscure to discover than the latter. In the front, by means of the cartilages, there is more elasticity, and therefore a compensating power for saving the motion between the two portions; but behind the ribs have a greater latitude of motion in the dilatation of the chest, and therefore there is more pain. When emphysema occurs, it is usually in fractures of the upper ribs. In expiration, when the atmosphere presses equably on the whole chest, no displacement takes place; but in inspiration, when the whole ribs are drawn upwards and pressed outwards, the parts of the rib are displaced, and then this fracture is most readily discovered. It is on this account that a bandage is so necessary; and if the fracture is of one of the true ribs, it is proper that it should be applied so as to take in the highest ribs that it can possibly be made to reach. It is not only necessary to keep the broken rib in a state of inaction, but to insure this, all the upper ribs should be so compressed that the chest may be prevented from being dilated laterally as much as possible. But even in the male, where the mammæ do not prevent the application, there is a power that will not allow the back part of the apparatus to keep up: this is the motions of the scapulæ, which are always thrusting it down, and the front part will follow the posterior. The arms should be kept motionless, and the bandage should have shoulder-straps. The ribs unite more quickly than any other bone in the body. The patient usually finds himself quite easy on about the tenth day.

In those cases in which several ribs are broken on each side, I have no recollection of recovery having taken place. I always consider that when more than one rib is broken, that the case should be regarded to be of a serious character: of course, the increase of danger with the increase of the number of ribs broken, is in reference to the important contents of the thorax.

I do not view emphysema abstractedly with so much apprehension as has been usually done, as I find so many cases that do quite well, and that with very little trouble. The first object is to adapt a firm bandage over the part of the rib broken, by which the effusion of air into the cellular tissue under the integuments, is stopped. The air passing from the wounded lung is now confined to the cavity of the pleura, with which it is filled, and compressing the lung. By this means the wound which was made while the lung was dilated, is more completely closed than could have been done by any contrivance of art. This wound is usually healed on the third day; at that period the breathing greatly improves, as air can no longer be effused into the pleura, the wound of the lung having healed. I cannot conceive that it can be necessary to make punctures in the integuments to let out the air in emphysema. The air, of all things is most readily absorbed, and almost instantly disappears the moment effusion ceases. I usually find that on the third day these cases are reduced to the state of a simple fracture of a rib.

In these injuries we find that a fracture of one rib is generally a case giving the surgeon little trouble; but fractures of two, three, or more ribs, offer a difference in a most marked degree. When more than one rib are broken, we have a case of importance; and if the fracture extends to several, there generally follows a fatal termination as the result.

The two last, or floating ribs, are often the subject of injuries that are more painful, and slower in recovering, than a broken rib. Most commonly they are violently driven inwards without being fractured. The diaphragm then suffers; and if they are broken, still the same parts suffer, and the pain is very great. In this case a bandage is of more harm than use, if applied over the fracture, as it presses on the injured parts, without having any support from other parts. If applied over the upper ribs only, it may have good effect.

I have had several cases of fracture of the sternum: occasionally it has been broken in a way to leave no depression of any amount, and without fracture of the ribs. These cases have done well; but where they have presented a considerable depression, and one or more ribs have been broken, the cases have been fatal.

A correct mechanical investigation of the power of muscular structure to resist the sudden application of violence, might prove that the resistance of a muscle in action is little less than that of hard matter. In the passage of shot we know how readily this structure deflects balls; and I have been called upon to reflect on the impunity often displayed in the way the wheels of carts, &c., have passed over the abdomen of both children and adults. These (often certain, and sometimes only reputed, cases) are continually occurring in the hospital, and they generally excite no anxiety after the first few days, if no viscus appears to be ruptured, nor hemorrhage produced. In connection with the subject of the qualities of muscles, I have to observe, that in wounds of the walls of the abdomen, where the three layers of muscles have been divided, I have always found that a ventral hernia has followed; at least, the structure which supplies the place of the loss of muscular fibre was unable to resist the pressure from within.

Perhaps in this result, we have an analogy in what we see going on in aneurism, where we find that when the middle coat, or that which has the character of muscle appropriated to it, has given way, the outer or fibrous one, however apparently strong, is unable to resist the impelling power of the circulation, and dilates to form the aneurismal sac.

Many cases of injuries to the pelvis occur in hospital practice. One very common is where the anterior superior spinous process is broken off, or a portion of the crest of the ilium. These, like those analogous accidents of the scapula, are very painful. I have observed that a blow inflicted on the insertion of a muscle, or still more of a tendon, is always exceedingly painful: but this painful state, in this case, soon ceases, and the bones unite with simple rest, as the parts are retained in apposition by opposing muscles. All bandages are useless, and only add to the distress. Fractures of the pubis and ischium, or separation of the sacro-iliac symphysis, are of the gravest kind, and bring with them excruciating sufferings; as, in addition to the injury of the bones, we find perhaps rupture of the bladder, laceration of the urethra, or other injury to the soft parts. It is rare to see recovery take place when the pelvis is so largely broken.

It has been assigned as a reason why the neck of the femur should most readily break in old age, that this part assumes with the shaft of the bone an angle less oblique than in earlier age. The least knowledge of mechanics falsifies such a notion, inasmuch as the force effecting the injury, when the neck is at right angles to the shaft, must then, as in this case, be met by the resistance of a greater part of the bone than when the neck is more oblique. The fact is, that the explanation will be found in the want of that preserving power, which arises from the combined and associated action of those muscles that surround the joint. In age an individual becomes infirm even in those movements which he has all his life been accustomed to, particularly in the power of balancing. He has no longer the freedom of acting with rapidity and with the assurance of safety, when the aberration of the centre of gravity requires a combination of actions to save him from a fall.

But if there is this want of ability to save himself from falling in the forward movements, how impossible is it for a feeble person to throw out any muscular assistance in case of falling sideways, and he thus comes to the ground upon the trochanter major: as the centre of gravity is in this region, he falls with the force of the whole weight of his body upon this part, and the cervix gives way. I have seen the force expended in crushing the bottom of the acetabulum. The fall is like a dead weight, or as a block of marble, and the projecting trochanter receives the impetus. The principles of mechanics have solved the problem, which decides that if a system of unequal bodies connected together be projected, so as to come to the ground indifferently as to the manner they may fall, the momentum will be expended on the largest body. The boy who falls frightened from the cherry tree will break his thigh ; on the same principle the elderly female breaks some part of the femur.

The first effect of this injury is the inability of moving the limb, particularly in the forward movement, the most practised one. The necessary association of the action of muscles is broken up, and their power over the joint has ceased. The second effect is its dropping outwards, owing to the whole weight of the limb being outside the axis of the bone as the patient lies in bed. But how does it happen, that, as all the powerful muscles are calculated to draw the limb upwards, there is at first hardly any appreciable shortening ? If muscles were always disposed to draw up parts when all resistance is removed, we ought to see more marked shortening. The limb is not shortened to the full extent of which the muscles are capable, and it often happens that this symptom is not apparent at first, but only after the expiration of some days. I am speaking of the case where the injury is actually at the neck. It is not usual to detect what is called crepitus in this case ; the displacement is little, and on moving the limb, the head, although severed from the shaft, yet moves on its own centre.

In order to state clearly my views of the proper treatment of this injury, I must observe, that, if we were to rest on those methods that would result from the appreciation of all the conditions of the case, we should be baffled by that state which age usually brings with it, the defect in the powers to support long and continued pressure We have a weighty limb thrown off, as it were, from the trunk; and the object is to impose an obstacle to the disturbance of this detached member in the course of the treatment. Any apparatus of splints or bandages must rather promote the derangement than otherwise, as the weight already keeps the limb removed from its connection with the trunk. The injury is so close to the centre of gravity of the whole body, that every slight movement must act so as to create motion between the broken parts. But these motions are only likely to take place in those actions where there is a movement forwards. The movements of the head, and of the limbs, are nearly all forward and backward, and all likely to affect the parts broken. In the slightest elevation of the trunk this must happen. While therefore the patient is on the back there is a continual interruption to the steady curative process; but on the side, even in young persons, there are so few lateral movements to which he is accustomed, and perhaps not one in which the movement is about the centre of gravity, that in this position there is the least possible interruption to the uniting process. It certainly is a painful position for the first few days, but the uneasiness soon goes off.

In this position, as the centre of gravity is directly over the injury, so the whole weight of the body presses on the bones, and keeps them in coaptation; and even if there were any displacement, the stimulus of uneasiness is enough to bring the parts into order. I have treated cases by this method, and they have turned out much better in restoring the powers of the limb than the plan usually adopted. The lateral position requires that the thigh should be bent on the trunk, and the leg on the thigh, as this is a position where the muscles are in the quietest state. The position of placing the patient half on the side and half on the back is doing little. The sound hip should be vertically over the injured one. However, the fact is, that the age of the subjects of this accident compels us to adopt the position on the back, and the inclined plane, as it is only in this way the functions of life, in the advanced stages, can be even tolerably well carried on. Moreover, as on the side the whole weight of the body is concentrated on the trochanter major, the chances of sloughing are much greater than when the pressure is spread over the large surface of the back.

The cases where the fracture takes place at the root of the trochanter, so that this process is still attached to the shaft of the femur, and the neck remains with the head, are not so common. We have in this case actual crepitus; and in rotating the femur we find it move about its axis only, and not revolve in a circle, as when the neck and head form the radius : the pain is in the part, and not just below the joint, as in the fracture of the neck. Here we have decided shortening, and that occurring early. I consider this a case where the treatment of placing the patient on the side is the best, as it secures him from the jars and displacements that must occur when he is on his back; and as the cases are usually in individuals of less advanced age as in the fracture of the actual neck, it can in general be adopted. In this injury the fracture unites well as to strength, but usually leaving the limb shortened; and if treated on the back, without great care, with the foot much turned out.

When we look at the strength of the muscular structures that brace up the hip-joint, we are surprised that the femur can be so readily dislocated as we know to be the case. The joint is so near the centre of gravity, that every impetus not directed towards this point is expended upon the limb, on which it impinges with very great effect; so much so as to disjoin the head of the femur from the trunk, inasmuch as it is expended upon the limb before it can be transmitted to the trunk. In the same way, if the person be bearing his whole weight upon his lower extremities, the impetus may impinge on the trunk and impel it in the line of its direction before the motion can be transmitted to the limb, and thus cause a displacement of the bone from the joint. In jumping or falling from a height, the whole weight is collected in the centre of gravity of the body; and thus, if the limb that comes to the ground first be placed obliquely inwards, the strong adductors being called upon to exert a powerful action, will place the head of the femur in a way to be projected obliquely upwards, over the upper part of the acetabulum, and throw it upon the dorsum of the ilium. If, when a patient is firmly placed upon his lower extremities, which are supporting the whole weight of the trunk, and any force be applied to the upper and outer part of the thigh laterally, the bone is then driven into the obturator foramen. This happens to excavators who, when digging, have had the earth fall in upon them. As far as I have been able to observe, the dislocation which leaves the head of the bone on the pubis is the result of some force, which acts by rotating the bone upon its axis outwards, turning the head inwards with force enough to rupture the capsular ligament on the inner side.

When we view the variety and the complications of the motions of the hip-joint, and calculate the pressure of the weight of the body, under which these delicate movements are to take place, and particularly the strength of the adductor muscles, which is required for preserving the trunk in the line of gravity, we see that a larger range of muscular associations is broken up in this dislocation than in the same injury of other joints. It is by the resistance muscles exert in opposing the means used in reduction of dislocations, that we may infer the immense power they possess when acting in combination about a joint.

I have seen, in the employment of the extension for reduction, the force continued long and powerfully after the bone was restored; yet this did not re-dislocate the bone, nor at all draw it from the socket. But I fully think it true that the muscles will not offer an effectual obstacle to the bringing the bone down to a proper position for the purpose of reduction, and that the difficulty occurring in luxations does not arise from want of power to bring down the bone, but from the failure of those means by which the limb is ultimately to be reduced, the process of extension being only a previous step. The ordinary manipulation of the surgeon goes no further than that of bringing the displaced bone into a position in which the muscles around the joint may resume their associated actions, and then they start, with velocity and power, the bone into its socket. This power which they exert is thus employed, as in the shoulder joint, considerably in opposition to the line of traction, and proves to be a force greater than that used in the extension. It is properly directed to conduct the traction slowly and steadily, not by jerks; this is quite reasonable. The extra-position of the bone is the excitement to the muscles to oppose, and just in proportion as the bone is brought back to the position in which their natural association becomes perfect, so do they cease to act in opposition. In placing a finger on the trochanter, I have found that the rate at which it moves increases as it descends. The facility with which the associated muscles may take on this office of assisting the reduction, must of course vary with the integrity of the muscles themselves, for some may be torn from their attachments. I have already stated a case of old dislocation, which I think I should have reduced, had I at the time of treating it been aware of principles I now understand; and even in recent cases surgeons should know that they have more expedients than merely making extension, such as the changing occasionally the line of direction of the extending power.

In old, if not even in recent luxations, the traction should not be from one fixed point, but in such a way that the direction may be changed, so that if the joint be taken as a centre, the extremity of the drawing power may move in all directions. In old cases it will be proper that the traction should be changeable in its direction, and that whilst the bone is being drawn down, it should be carried across the body, and a gentle eversion given to the limb, by which the reduction will probably be completed. There are grounds for inferring that this might effect the intention, from the success that has followed the plan in old luxations of the shoulder, where the great force used in recent accidents is not necessary. But I have not had the opportunity of putting the plan in execution in an old luxation of the femur.

It has been attempted to define clearly the period beyond which attempts for reduction of the femur should not be resorted to. I think there is fallacy in these calculations. There are, no doubt, limits for these trials. But I have no doubt that if at any reasonable time a replacement can be made, the patient will have a chance of recovering a very useful joint, and will be much better off than if the bone had been left displaced.

What are called luxations of the head of the femur into the ischiatic notch are rare. I am apt to think they should be described merely as a variety of the displacement of the head of the bone upon the dorsum ilii. They present less marked features to assist in the diagnosis, and offer more impediments in the facility of reduction than the other. I have had under my care within a few years two cases of luxation of the head of the femur upon the pubis. A striking feature in this case is the mobility of the limb, which can be rotated easily on its axis. It lies parallel to the other limb, and is little varying from it in length. The position of the head is not so easily detected as it might be suspected would be the case. We have in this dislocation but little derangement of the association of the muscles that move the bone from that which occurs when they act on the natural centre of motion; therefore but little manipulation is necessary. It is only necessary in reducing it to draw the head a little from the pubis, and to direct it to the situation of the acetabulum, when it will be restored. I had not long ago a child of five years of age with this luxation, in whom the head pressed upon the bone just below the inferior spinous process of the ilium: a short and easy manipulation readily reduced the luxation.

The dislocation of the head of the femur into the obturator foramen is rare; but I have seen such cases. The straggling posture it gives to the limb marks the case. In this luxation the limb is fixed. The same principle obtains in the reduction of this displacement as in all the others, that of drawing out the bone, and then directing the head to the centre of the acetabulum. To fulfil the directions given in these cases, of course the traction should not be fixed in one point, but in a way that the direction of it may be varied. As in this case the head of the bone is more removed from the centre, around which all the muscles act, so there will be more strength required in drawing it out, than in the last case.

In order to explain some of the conditions of the muscles interested in fractures of bones, I shall observe one circumstance that is really confirmatory of the position I have taken, that of the complete association by which muscles act in the movements of joints. It is when this consentaneity is broken up in fractures, that the parts of the broken bone are left under the influence of those muscles that have, by their insertion, the greatest lever to act with. This is greater, in proportion as the broken portions are more displaced.

The fracture of the shaft of the femur offers analogies to that of the humerus. When the fracture occurs just below the trochanter minor, we have to contend with the functions of two of the most influential muscles of this part of the body, the psoas and iliacus. These are in constant exercise in all the balancing motions, whether it be in the erect or sitting posture, and even when lying along; and therefore it is not easy to find such a position as shall allow of their being in the greatest repose. My attention has been drawn to the fact, that in the treatment of fractures of this part of the thigh, the patient being placed on the inclined plane, and the upper portion of the bone having risen above the required level, when the lower portion has been elevated to meet the line of the upper, the latter has started up still higher. I explain this by the fact, that when the limb is bent, it is supported almost entirely by these muscles; and the more therefore it is bent, the more their exertions are required: and thus they follow the course appointed for the discharge of their ordinary functions. I believe the position best for the coaptation and quietude of the bones would be for the patient to lie on his abdomen, this being a position in which they are never called upon to act. But the placing the limb on the side prevents it from being unduly acted on by these two muscles. The lying upon the back seems to me the most objectionable, as on the slightest movement of any part of the trunk, these muscles are called forth to act. Any one with a sound limb may find this out, as he cannot move even slightly forward, but these muscles are necessary to balance his trunk. In this position on the back also, the sartorius is called into action in the movement forwards, giving a twist to the lower portion outwards, in which form the fracture usually unites. As these muscles are engaged in balancing both in the erect and recumbent position, they will be called upon in every change of position to disturb the bones when the patient is on his back. They are not called upon in the lateral movements; at least so few individuals make use of their lateral powers of balancing, that in this posture they are usually inert. In this lateral position the parts are left in quiet repose, and in the best way to help forward the process of union. On the back the least movement transmits its impulse to the bones, deranging the adaptation that has been procured.

All that has been said in favour of the reasons for preferring the position on the side in the cases considered above, applies equally to fractures of the middle of the shaft. There is the appearance of great advantage in the inclined plane, as it is called, and its use is very commonly adopted. The position on it is liable to disturbance from any forward movement, as above remarked. The excess of weight of the outer part of the knee and thigh being on the outside the axis of the bone, causes the limb to fall outwards: to meet this derangement, the foot is bound to a foot-board; which very confinement excites all the muscles to exert an influence to relieve the irksomeness they are under, and the trunk is by an insensible muscular action imperceptibly brought to the leg, which is confined.

Surgeons impute to the inclined plane circumstances which do not belong to it. It does not entirely support the leg when it rests upon it, and this degree of support diminishes as the angle of elevation increases; and further, as the thickness of the calf of the leg prevents the whole of the lower part of the broken thigh resting upon the face of the plane, this part overhangs as a lever, and allows the leg to act as a weight, drawing down the knee and elevating the broken bone at the place where it is fractured. The action of the sartorius, which cannot be prevented in the position on the back, must have also some influence in giving the form which the bone always assumes, when united under this management, of bowing outwards and forwards. By the treatment on the side position, these defects are in a great measure prevented. It is to be observed that to carry out effectually the advantages of this last method, the trochanter major, the external condyle, and the external malleolus, should be accurately placed in the same plane, and the hips should be kept the one vertically over the other. (*fig*. 2.)

When the femur is broken just above the condyle, the straight position is adopted, which I consider to be the proper one. In the straight position the extensor muscles will combine their action to keep the bone in a line. But if the leg be bent, these muscles cease to act so favourably; and the hamstring muscles being now in that state in which their actions are usually called forth, combine to derange the broken parts. The power of their action is also then increased by the advantage of an increased lever for their action.

Some surgeons adopt a plan of treating fractures of the femur by means of a long splint, and binding up the limb tightly over it. Occasionally a favourable case has turned out in this way. The success of this treatment rests upon the making the trunk and the limb one whole, so that the limb is protected from all disturbances from collateral actions. The patient is to keep on his back perfectly recumbent. The objection to this plan is the great use of bandages, and consequently hindrance of examining the limb from time to time, owing to which circumstance I have seen very bad unions follow.

Occasionally there are fractures which are carried from the trochlea of the patella, between the condyles, to one side or to the other of the shaft of the femur—an analogous case to what has been referred to in the humerus. The remarks made on that accident apply to this. The straight position is to be adopted; and the parts are to be preserved in all possible quietude. A very careful adjustment must be made of the parts, but on no account must pressure be made on the patella. The least irregularity in the relations of parts when united must produce imperfection in the functions of the joint. I believe generally that getting the parts in as nearly correct position as possible, and leaving them in repose, there is a better chance of useful union than by all the contrivances that the surgeon's ingenuity can invent. The natural action of the living structures has not only the power of restoring parts injured, but also of retrieving the impaired functions of them.

I do not think that the surgeon can impart any relief to a joint by taking upon himself to be the agent of its motion. Nature does not stamp her assent to this kind of proceeding. In injuries of joints, such as fractures into them, the surgeon is often directed, after a week or so, to adopt passive motion; this he does, and the patient complains of the pain it has left. He repeats the movements, and more pain is inflicted: he now finds less latitude of motion in the part. No motion should be allowed until the union is perfect, and not until it can be done without the least pain. There is always a tendency in the conservative process to restore the perfection of a joint; and the efficacy of this agent can always be relied on without the contrivance of artificial means. The muscles that move, and the construction of a joint they are designed to move, form an integral system; and if any imperfection should remain in the latter, it is not by motions produced by adventitious agency, but by the actions of the muscles with which there exists a condition of conformity to the structure, that the adaptation is to be restored. A young lady of about seven years of age, playing in the garden, fell on her elbow, she felt little of it, but it produced a slight enlargement; her mother showed it to the family medical man; he finding it stiff, and a little swelled, advised it to be freely moved. It got worse, and she was brought to me. It was just that slight injury which so usually sets up scrofulous disease; there was considerable enlargement about the joint and pain on motion. The chief treatment was perfect rest and mild counter-irritants. It immediately got better, and in the course of two or three months was quite well. A gentleman that I attended with a fracture of the olecranon, after having gone on very well, so that at a proper time I was enabled to say the fracture was united, found that the joint remained very stiff. This he thought ought not to be ; and he went about to inquire the best way to make a stiff joint movable: all sorts of propositions were submitted to his choice, from sawing fire-wood to being one in ringing a peal of bells. These mechanical operations rather made him worse than better, so that he yielded to my advice, and kept the limb quiet, by which in a very short time, it was quite as movable as the other arm.

Those injuries where the tibia is pushed back into the ham are the effect of violence impressed upon the part so as to rupture the ligaments; they usually require little treatment otherwise than the observance of position; which should be on the side, as in this state the ligaments are under no restraint, it then is in a position in which the tibia can rotate on its axis. I consider it a principle in treating injuries of joints, where there is fracture into them, that in general, the best position is that in which the appropriate actions can be exercised if necessary, which motions may often be used without damage; indeed this little interference with the quiet state of the parts is very likely to call forth the powers for preserving the function of the structure. In most of the cases I have had, the restoration of the ligaments has been imperfect, and therefore the limb has been disabled by its inability to become a firm pillar when straight. I had a patient in the hospital, who had only the internal lateral ligament ruptured. It produced great deformity on the first appearance, with a tucking in of the integuments over the joint: this seemed to arise from the pressure of the atmosphere. Of course the deficiency of the ligament allowed great latitude in rotating the tibia on its axis. The joint was readily restored to its proper relations by flexing the leg on the thigh, and keeping it quiet on the side. No apparatus was used; and the case did quite well.

The greater number of fractures of the patella are produced by the sudden effort of the muscles to preserve the balance of the body, when it is in danger of falling backwards. In this position the patella is not wholly supported in its trochlea, the upper part lying hollow, and thus it gives way to the effort of the muscles. In selecting the best position for the recovery of the injury, of course we should adopt that which can most completely secure the inaction of the muscles inserted into the bone. I believe this object might be very well effected by placing the patient on the side; but as the time required for the treatment is long, and as the position on the back is sufficiently effective, the latter plan is usually adopted. But that the patient may be secured from the injurious effects of forward movements, the whole extremity should be made to form the least possible angle with the trunk; in which position the extensor muscles can only act with great fatigue, and therefore will remain passive. I must observe that I always find that when the fracture is produced by the agency of the muscles, it is never in any part lower than the middle line, generally above, and even so much so that a scale only is sometimes broken from the upper edge. But if it is effected by a blow on the part, then it is in the middle, or in the lower half. I have found that short lusty persons are those who more commonly suffer fractures of this bone from muscular efforts.

In speaking of the position and the security for the repose of all the muscles engaged in the motions of the patella, I have detailed the chief requirements, I believe, that the surgeon is called upon to execute. This is an injury of the joint, with consequent effusion into its cavity, the absorption of which forms therefore the first step in the curative process. This being done, we find the next step that is carried on is that the rough edges of the broken parts are absorbed and bevelled off. After this, these edges are gradually brought towards each other, by means of that medium which is begun to be formed by which the fracture is to be united. Here we see, quietly going on, an example of a process which, in surgical pathology, is often brought under our observation. It is, that the medium of union, in parts separated, is the means also of approximating the original parts that are removed from each other. In cases of loss of cutis, the sore is not so much closed by the breadth of the granulations, as that these, in their formation, are gifted with the power of bringing the edges of the original parts of the cutis close to each other. In the fracture of the patella, the muscles will not offer the least obstacle to the approximation of the broken parts. Every system of parts seems to be protected by an influence which is to insure the welfare of their functions; and as we know of no parts which may not develope themselves into a system if scientifically investigated, so we cannot conceive that the conservative power can fail to re-establish all the deficiencies in structures that are essential to the functions of parts. In the fracture of the patella there is a provision for the preservation of the functions of the knee-joint. The medium that is formed to connect the broken bones is really the mechanism that will draw the parts together; and as this medium is formed for this purpose, then will the muscles, on their part, yield in obedience to the associations of these functions exercised under the excitement of injury. The power of conservancy is as much called forth to remove all opposition to the completion of the integrity of a system, such as is the joint, as to restore the injury of a mere part. The formation of the medium, and the subsequent absorption of it, are but parts of an adventitious function set up for repairing the injury.

I have spoken of the necessity of position, which is the obtaining and the preserving a state of repose for the muscles of the limb. I have omitted bandages, as I conceive that they are not merely useless, but injurious. I have seen that the cases that are treated without them turn out better than those in which they are used. But I apprehend they are injurious, because, although bandages may restrain the power of muscles, yet they by no means tranquillise their actions; indeed, they rather excite them. But the great injury a bandage may do in all hurts is, that its pressure may cause that inflammation or action which is set up for repair, to be the cause of connections being formed amongst all the surrounding parts, so that adhesions take place of muscles to their tissues about them, or of tendons to their sheaths, and that when the part originally injured is repaired, the patient has to contend with the imperfections that pressure has left upon the limb. Thus he may be waiting months, and sometimes enduring much pain, before the use of it is restored to him. If the bandage is not tight, it does not retain the parts; if it is powerful, it produces these consequences. Besides, the bandage usually causes the parts of the bones to tilt, particularly the lower portion, by pressing on the ligament of the patella, so that the edges look upward, and do not face each other. It is in this simple way of treatment that I have found the fracture of the patella best unite. The profession give properly a longer time to strengthen this union than for that of other bones. I find that, at least, a month is required for keeping the patient in the angular position; after this I lower the limb, so that in six weeks he is indulged in a flat bed. After this, I allow him to get up, and rest upon the side of the bed for a portion of the day; he has now all his muscles free from adhesions or contractions; and by following the steps I shall have to allude to, will, without crutches, soon be able to walk across the room.

About two years ago, I attended a lady with a broken patella on one side, who had had the same accident on the other knee some years before. She spoke in high terms of the great advantages of this plan, by which she was so soon enabled to get about. The former case had been treated by bandages; she had a long confinement, and was several months before she got on her legs. The parts of the bone were also left much asunder.

I have said that I have noticed that when the patella is fractured in the upper half, it is generally by a muscular effort to preserve the individual from falling backwards. The patella, when the leg is slightly bent, as it must be in this state, lies with its upper part hollow, and the centre is therefore supported, as it were, upon a fulcrum; and in the action of the muscular system, to preserve the line of gravity of the body in its proper direction, the rectus femoris of course is deeply engaged, as arising from the trunk, and probably the crureus, by consentaneity of action: these are called into full power, and thus the upper part of the bone is broken off. It sometimes has occurred in the cases I have had, that only a scale, or the mere part to which the rectus is attached, has been broken off. When this occurs, this scale is often carried high up; because the rectus, being free of the bone, can alone remove it so far. Such I conceive was the case which procured Mr. Hunter the credit of restoring the use of a limb after this accident. But if it be only a small scale, it must be remembered that the lower part is left in its original power of action, and therefore the patient can move the leg on the thigh, but has lost the assistance of an useful aid in balancing. If the fracture be low down, near the ligament of the patella, there will then be less separation of the parts. In the above case of a scale, separated and high up, the same treatment is calculated to draw it down. No force can do it, but repose, and the approximating quality of new media, will effect it.

But an accident essentially the same in its conditions sometimes comes under treatment. It is the separation of the attachment of the rectus and crureus from the patella, without a particle of bone being carried with them. A gentleman was walking up some steps, when he found he was falling backwards. The muscles most interested in preserving the balance of the body made a sudden exertion, and he felt something give way at one knee, and he fell. He contrived to get upon his legs, and in making an exertion to balance himself, he felt the same sort of snap in the other knee, and he again fell. He was brought home, and sent for me. I readily assured myself that the rectus and crureus were detached from each patella. The bone was entire, and there was a vacuity above the upper edge of the patella, which might lodge in the depression two fingers by breadth. There was a good deal of swelling around the joint. I treated it precisely in the way I have above described for the fracture of the patella, avoiding all bandaging, and relying upon the efficacy of the power of conservancy for carrying on the reparation. In a very short time, a medium was formed, filling up the vacuity, and simultaneously the muscles became approximated to the patella : in the course of about six weeks the attachments seemed to have become as perfect as they would have been in the unhurt state, as far as the examination could make out — a result gratifying both to the patient and the surgeon. He was very soon able to walk across his room, and when I saw him a few months after, he told me he could walk nearly as well as ever, without the aid of a stick. In this case I presume no surgeon would have put on a bandage, as this could only serve to tilt up the patella, and obstruct the coming down of the muscles to their proper attachments. Long before this case occurred, I had another of the same kind in one knee, in which bandages were used. The recovery was slow and imperfect, as the patient could not do without a stick for some years, and the limb remained always weak.

I have had cases in the hospital where the patella has been crushed into many parts; the integuments torn, and the joint exposed; yet they have got well, leaving the bones of course anchylosed. It is not unusual for violent injuries to joints to give rise to less disturbing processes in regard to the system, than those of mere puncture, &c.

The patella is often luxated, and all the cases that I have seen have been outwards. As the leg in all persons, but particularly in some in a greater degree, makes an angle inwards with the thigh, so the attachments of the extensor muscles and the ligament of the patella make an obtuse angle with the base of the triangle outwards; and therefore if any part of the connections of the two bones give way, owing to the influence of these muscles, the bone must be carried outwards, as I have always found it. It so readily resumes its place on the limb being placed in repose, that the surgeon does not always witness the displacement; of course there is no difficulty in adjusting this derangement. But there is little prospect of preventing the repetition of the luxation, as the restraining structures of the patella laterally are not restored to their proper state. The adaptation of a bandage when the patient gets about, is by no means easy. The influence of the vastus internus, owing to its insertions, probably is the best agent to keep the patella in its proper place.

But there is a dislocation of the patella of a very different kind. It is when the patella rests in its trochlea, but is turned on its edge; the inner edge is applied to the femur, the outer of course standing out at right angles to it; the upper surface faces the other knee, and the articular surface looks outwards. It might, on first consideration, be supposed that a replacement could be readily effected; but practically it is a very formidable undertaking, if the surgeon has not entered into those views I now offer to the profession, in connection with the association under which muscles act. Some years ago, I was called suddenly by a surgeon to assist in reducing a dislocation of this sort; for effecting which, the medical man had resorted to all the various expedients he could contrive for effecting the purpose. I found the patient to be a gentleman who some years before had, in the common way, dislocated the patella whilst shooting; and that he had subsequently had the same accident often occur; but now it had become the dislocation of the above kind. The surgeon had exhausted his ingenuity: however, we resumed the series of contrivances with all the powers we could exert of lateral pressure on the bone in all directions; but nothing availed; and it seemed to me as firmly fixed in position, as if three or four long screws had been driven through its thickness, and bound it most closely to the femur. All this time we were acting in the falsely received notion of relaxing muscles by merely keeping their attachments as much as possible approximated to each other, and the leg was most carefully kept extended on the thigh.

After a long course of trials in this way, it occurred to me, that I might effect some change by giving the bones a sort of shake; for this purpose I slightly bent the leg, and gave a little rotatory motion to the tibia, when the patella quietly returned to its proper situation, as if a charm had released it from its fixed state. The hand of an infant might now have deposited it in its trochlea. The result of the manipulation in this case led to reflections which opened to my view principles very different from those I had formerly held. It offered a forcible example, that any muscle disturbed in its arrangement is under great excitement to act. The disturbed arrangement here was the elevation of the centre of action of the extensors above the ordinary position ; and as these muscles, in the straight position of the whole limb, are called upon to support a great proportion of the weight of the body, so when in that position they are naturally impelled to exert a vast force. But in obedience to the associated action of combined muscles, when the leg is bent, and another order of motions in this complicated joint is brought into play, then these extensor muscles immediately relax; they would otherwise by their action prevent the rotatory motion of the leg upon its axis. Thus the moment the leg was bent, the extensors returned into a comparative state of repose, and left the patella quietly to resume its appointed position. Not very long after the occurrence of the above case, I was called one night to the hospital to a similar one. The house surgeon had adopted all the means of ingenuity and of force, but had not succeeded in reducing it. I bent the leg, and rotating it in the axis of the tibia, the patella quietly returned, and thus was accomplished the reduction.

In the category of luxations about this part, I must place that of the semilunar cartilages. I have had several of these cases under my management. I think I may say that they have always been, as might be expected, of the internal one. The case is marked by the joint becoming, on some quick motion of the trunk about the axis on one leg, locked. Often there is great pain, and a slight projection of the anterior edge of the cartilage beyond the margin of the head of the tibia. It is a fact, that the pain is sometimes excruciating, and will continue, yet the moment the cartilage is reduced, no pain or even tenderness will remain. I have seen much force, and varieties of positions given to the knee by powerful means; but all, on principle, must be worse than useless. I have only seen one case in my practice ever reduced by any thing like force, and that was in a man who had frequently suffered the same, when by carrying the leg as far back as could be done, the cartilage slipped into its place. The true way of manipulating here, is to place the patient on his affected side, with the limb bent, and then to rotate gently the tibia on its axis. In this position the joint is loose, making no pressure on the cartilage, and it has the best chance of quietly slipping into its place. I have often known in this luxation, when left alone, that whilst the patient was asleep the cartilage has slipped into its place, after a few days. A medical gentleman in the country came to me not long since, to confer with me about a case of this sort in a patient of his, a miller. He had tried every expedient in vain. I assured him he might make his mind easy, and go back and try to keep the miller in bed, and it would slip into its place while the man was asleep. He very soon wrote to me word, that, to his joy, it happened as I had predicted, even though he could not prevent the miller going into his mill. I have seen great violence used in efforts to reduce the cartilage to its place, but all to no purpose. If the gentle rotatory motion does not succeed, the only thing is to keep the patient in bed, and in some of his slumbers all will come right. Of course, if this accident has once occurred, it will be liable to happen often.

I design now to make one or two observations before I proceed to those injuries of the leg in which the muscles are interested. In calculating that position which may seem most adapted to place the limb in repose, it is necessary to regard the habits of the individual in reference to the degree of use with which in one direction or in another he may have accustomed his muscles to act. Thus the leg of a soldier requires a straighter posture than that of a waterman, for repose.

I am far from thinking that pressure over muscles is calculated to quiet them, I think it really irritates and makes them fidgety; inasmuch as in a limb the muscles and the bones in their functions form a system of their own, and have a principle of conservancy between each mutually established; and for the duly carrying out the processes of reparation, the work of nature requires repose, as the first step to allow her efforts a due course of action. In healthy patients, where injury is to be repaired, the business of surgery is solely to guard against those disturbances that may interfere with the necessary processes. The common expression of relaxation of muscles, on the occasions in which it is usually used, should mean the placing the limb in such a position that the whole association of relations should be quiescent. If a broken leg be put up in any given way, and after a fortnight, more or less, the surgeon wishes to change this way, as for instance, from the position on the back to that on the side, he submits his patient to disquietude, and perhaps torment. The work of reparation has begun in one way, under the position imposed upon the limb, and any change of the arrangement under which the power began to operate, interferes with those series of actions, by which they were commenced, and thus inflicts a disturbance calculated to impede the healthy process.

I have so explained my views, that I may now say that fractures, and particularly of the leg, should not have any more apparatus applied than just enough to guard the limb from those disturbances that may by chance be made. The employment of bandages is not only useless but injurious; in the first place, they produce an unnecessary derangement of parts in their application and daily adjustment, interfering much in the processes going on to effect the union of the bone; they also have the effect, every day they are continued, of lessening the tone and power of the muscles. The object should be to have the muscles as little deteriorated in power and freedom of action as possible, so that when the bones are firm, the patient may have these organs in the very best state of usefulness; by which the patient saves not only weeks, but months, in acquiring the full use of his limb. I have very often discharged men with broken legs, both bones being broken, at the end of a month, who could walk very fairly, and in less than six weeks were capable of any labour.

I allow most of my cases to get a little about in three weeks. It occasionally will happen that the bones are tardy in uniting; sometimes the fibula will be the first to unite; and the tibia is left un-united, but more commonly the tibia is united first and the fibula left un-united. If this state of want of firmness, or un-united condition, continues beyond the full time of usual recovery, I allow the patient to get up and try the powers of the limb. Mr. Hunter recommended this course, and accounted for the success that generally follows, by saying that it brought into action the stimulus of necessity. I conceive this is really an exemplification of that principle which I have laid down, which is the association established in the system between the muscles and bones of a limb. The strength of the bones has a relation to the actions of muscles, and when the latter are increased in power, the strength of the former follows in order. The structures being obedient to the occasions of the functions.

When the patient is in a condition to be allowed to use his limb, I think there is not the least occasion for crutches; they require that he should learn the art of using them, and when the time arrives to do without them, he has then still to learn to walk alone. The best, the surest, and the quickest way of learning to walk, is to enjoin him, as he sits, to rise occasionally, and bear the least he can upon the ailing leg; he will soon get on in this way to bear very tolerably upon it, and having got power to stand, while bearing on both legs, he should then manage to crawl or drag his leg round a table, and when he can do this tolerably well, he will feel himself bold enough to launch into open space without having any thing to lean upon or to assist him. On crutches there are many combinations of muscles required which he has never had called into use. To learn again to walk without them is only to unlearn that which he has just got the habit of doing. In this way I have often seen a patient recover the ability of walking in a very few days after the commencement of the trial.

In the treatment of fractures, the first object, of course, is to take measures for the adaptation of the broken parts. For restoring the whole economy of the limb this is necessary, as well as in reference to the bone only; for we are aware that in proportion as this is effected, so is the perfection of the union, and the shortness of time required for effecting it. To accomplish this coaptation, surgeons have been wont to conceive a high notion of extension. I believe it is rarely required. If the bones are broken with inequalities, it will not answer; if they are merely snapped asunder, it is not much wanted, as the bones will then lie quietly in fair position. It is astonishing how strenuously and how perseveringly I have seen some surgeons try to get the bones of the leg in coaptation, and all in vain.

It is the surgeon's duty to ascertain the way in which the injury has been effected, and then he can adopt that way which is appropriate to the nature of the injury. If the force which effected the injury was applied at right angles to the leg, as when a wall falls whilst an individual is standing near it, and the leg is broken by a lateral force applied against it, all power by extension in the manipulation will not reduce it; but if he bends it to the form in which the injury was produced, and then gradually, and with the hands applied to the fracture, brings it to a straight line, it may be most accurately adjusted. We are to take the example of the green stick, when partially broken.

This adjustment, which is understood by the word coaptation, being effected, the chief part of the treatment of a broken leg will be accomplished; if the limb were an isolated part of the body, that is, if it were under no influences external to itself, it probably would suffer no disturbance in the progressive advance to ossification. Any tendency to displacement by the muscles of the limb only would soon be adjusted by the power of accommodation going on for the first few days; and the advantage in this case would be, that when the bones were united, the muscles would be in the best possible state to render the leg at once useful. But we must not regard the leg as a separate part, uninfluenced by other agents. It is under the influence of the whole muscular system of the body, and every movement of any one part may derange the proper position of the limb. Therefore when the patient is on his side there is less of this associated influence to disturb the order of the position than on his back; though still on the side some assistance is required from mechanism to maintain the limb quiet. It is only in the very first period of the treatment that the muscles are disposed to disturb the adjustment of the bones. If the limb be kept in its natural arrangement, the muscles soon resume their original association, and leave the bones quite undisturbed. A necessary part of the treatment is, that for the first fortnight the limb should be daily inspected, and any little derangement rectified: however refractory the muscles may be at first, they soon relapse into quietude, and admit readily a right arrangement. I have formerly seen, in times when it was the usage of surgeons to keep their cases a very long time in bed, a patient with a broken leg, who was able to throw himself into a variety of attitudes and actions, while the limb lay as quiet as if it had been glued to the bed. As far as muscular action was concerned, the limb was dissociated from the rest of the body, participating in none of the movements that were taking place. But when the time came that the patient was to get about, he had to educate all the muscles of the limb in their natural associations, and also to implant the necessary vigour into them for the purposes of restoring motion. Thus weeks, and even months, were uselessly wasted before perfect recovery.

I was thus convinced that one chief point in the treatment of fractures, more particularly of the lower limb, is to release the muscles from restraint the moment the broken bones are ascertained to be tolerably firm. It occasionally happens that on leaving off the apparatus, although the bones seem to be united, yet pain comes on in the fractured part: this points out the propriety of re-applying the apparatus. In general a week longer is all that is required. I have invariably observed that when a bone is broken, and the limb is left subjected to all the little changes of motion, by the omission of the apparatus the first day, about the third the pain becomes very considerable, and is immediately relieved by the adaptation of means for preventing motion between the broken parts.

The mechanism should be of the simplest kind, and interfere as little as possible with the muscles. The splints should be adapted for the bearing upon the extremities of the bones, and they should be sufficiently broad, so that the straps should not at all press upon the soft structures. The straps should be strong, of good web, and the buckles well made. Two are all that are wanted in the leg, as such an apparatus as I have described keeps the whole limb in the most perfect state. As for the purpose of inspection the upper splint has often to be removed, and as it cannot be done too gently, the employment of buckles will jar the part much less than any other contrivance.

The causes of the various and numerous fractures of the leg brought into St. Bartholomew's Hospital may be arranged under a few distinct heads in regard to the mode of the infliction of the injury. First, a considerable force may be applied directly to the part fractured, as in the passage of a vehicle over the limb. This mode of inflicting the injury is attended by one circumstance, which is, that owing to the contusion of the muscles the bones are less liable to displacement by muscular action, but the process of union is sometimes tardy. The examination of the limb does not give the sensation of crepitus. The kind and degree of injury of the bone must vary according to the place where the force is applied. Thus in the upper part of the limb, where the bones are more covered with muscles, they sustain less violence than nearer the foot, where the bones by lying hollow when on the ground are more liable to be splintered and shattered by the incumbent pressure. In this part of the limb these injuries are commonly compound fractures. Another mode in which the leg is often broken is by a force applied at right angles to the limb, when the patient is erect; this force presses the bones into a bow, as it were, and they are broken with spicula at each end. They are much like the fracture of a green stick, and must be adjusted in the same manner. The stick can be restored to straightness, first, by bending it, and then by modelling the parts with the fingers; to which I have already alluded. A third mode of producing the broken leg is, when the patient falls from a height, and the leg is obliquely placed, instead of perpendicularly, as he comes to the ground. The fall produces the oblique fracture, very generally compound, with the sharp point of the bone projecting through the integuments. The case where the leg is caught between the spokes of a ladder, wheel, &c. is of the second class, and requires the same manipulation for adjustment.

It has occurred to me to see a few cases in which the tibia has been broken alone, and without showing the least irregularity in its form; so much so that they might readily have been overlooked as fractures. The subjects were mostly children, and the accidents happened on jumping off a low height. I conceive the explanation of the production of the injury is, that in the fall, which is upon the foot, whilst the bone has to sustain the weight of the body pressing in the line of gravity, a lateral force is exerted in the direction in which the boy jumps; and the force resulting from the two, acting on the bone, breaks it in the way alluded to.

I need not repeat that the chief points to be attended to in the treatment of simple fractures of the leg is to keep the patient on his side, the two hips being in a vertical line, and the whole limb so resting that the external ankle, the external condyle, and the trochanter major may be in the same plane, to avoid bandages, to place one splint under and one over, sufficiently broad, so that the strap (not of leather) should not touch the leg. I need not say that, in the weakly subjects we often have in hospitals, it is quite necessary to watch that no pressure may be unduly applied. Most commonly, in three weeks, or even less time, I dismiss the splints, and often, in less than six weeks, the patient can walk out of the hospital.

I shall here mention, that I have several times had women, when pregnant, with broken legs, but found no difference in the progress of union. Most commonly the fracture of the fibula only requires little restraint in the limb after the first fortnight. There are few accidents more numerous than the various injuries to the ankle joint: they admit both the terms of luxation and fracture in reference to the construction of the joint. The mere inspection of the bones shows, that whilst the tibia rests vertically over the astragalus in the erect position, the fibula bears on the outer side of the astragalus, on its oblique plane, and supports the weight in that very slight degree which the laws of this part of mechanics explain; and thus if such a state of things take place as to remove the support of the tibia, the fibula is left with so little bearing on the astragalus that it gives way and breaks. Thus if a person jump from a carriage going at a great speed, if it be on the right side of the vehicle, and his right leg come to the ground, his centre of gravity moves with a velocity and in a direction compounded of these two forces, — that of gravitation and of the forward motion; the whole force would be expended on the inner ankle, and of course the deltoid ligament would be ruptured, or, what very often happens, the extremity of the malleolus broken off. The moment this has happened, the whole weight of the person comes upon the fibula. This, of course, is unable to support so much force, being now placed out of its usual bearings, and the weight acting on the fibula obliquely to its axis breaks the bone about two or three inches above its connection with the tibia, this connection being too firm to give way.

We have presented to us in the hospitals very many modifications of this accident — from that attended with great displacement to that of a strain only; and I believe that when the fibula is broken, not from violence applied at once to the bone, but by some slip of the leg, it is effected upon this principle — that of too much bearing on the fibula without rupture of the deltoid ligament.

The causes of these injuries are, we find, in women, by getting a twist whilst walking in pattens, persons slipping off the curb, porters carrying loads, and taking a false step. Sometimes the deltoid ligament seems only strained; sometimes the small end of the malleolus is only broken off, and the fibula broken; sometimes the ligament has so far given way as to allow the fibula to be broken without any mark of visible injury to it. But still the real type of these modifications is a very common accident; that in which the foot is turned with its plantar aspect looking outwards, and the fibula broken. But even this complete case may occur without the surgeon being at once aware of its character; the displacement is so easily reduced, that this may take place before he is called to the case. The treatment is to place the limb in a state in which the muscles generally may be in the greatest repose. We find in this case, that even the advocates for the inclined plane are ready to adopt the side position. The surgeon will find now the great difference of the state of the gastrocnemius, when the foot is extended, and when it is bent: as he brings the foot from the former state to the latter, he will find this muscle relax to its utmost. By frequent adjustment this injury recovers quite; and we find the patient has the perfect use of the limb in a moderate time.

The luxation of the tibia forwards is not an unusual case: we find the end of the bone is brought in front of the astragalus, and in various degrees of displacement. This dislocation implies a fracture of the fibula, somewhat lower down than in the last case, which I have always found to be the case when the displacement was considerable. I have said the tibia is advanced forward in various degrees; and therefore, as it is only slightly so on some occasions, it behoves surgeons not to set such a case down as a fracture of the fibula only, as I believe is often done; for otherwise the injury may leave imperfections which could have been avoided, had a correct view been taken of the case originally. If the tibia be advanced forwards upon the astragalus, even in a very slight degree, it prevents, when the injured foot is behind the other, that free motion of the foot upon the leg, and the formation of an acute angle between them, which is so necessary in progression, and thus a hobbling gait is produced. The surgeon should be accustomed to calculate all the bearings of the principal parts of the foot, and to measure distances between them.

The conditions of this accident are, that the external malleolus does not lose its connections, the external ligament being entire, but the fibula is broken above; therefore the upper part of this bone advances with the tibia; the internal lateral ligament must give way to allow the tibia to come forward. This advance of the leg upon the foot is equal to throwing the axis of motion so far forward, that the foot is under a longer lever for the muscles behind to act upon; and agreeably to the positions laid down, the foot being extended upon the leg, the position in which the gastrocnemius is used to act most powerfully, this muscle exerts all its force to draw the heel upwards, and continue the displacement to the utmost. However well the surgeon may adapt the parts, yet a very slight movement of the patient will be enough to displace them; but perseverance will fully complete his purpose, and he will find, by daily adjusting the disturbed parts, that they will each time he does this appear less deranged, and thus before many days quietly remain in their proper position. In this determined way of continually rectifying the irregular changes, I have seen these cases turn out very well, giving the patient the perfect use of the joint. If the patient be placed on the side, the leg bent on the thigh, and the foot upon the leg, the surgeon will find that the muscular system lies in the greatest possible state of repose. When he bends the foot, whilst it is extended, he will find every instant of time employed in this operation, the opposition of the gastrocnemius until it arrives at its greatest flexion, and then the muscle ceases to act in opposition. There is an endowed power that always assists with its efficacy the tendency to natural arrangement; and this influence being maintained by continual readjustment, distortion is prevented. The simplest apparatus is necessary; and all coercion of the muscles is to be shunned. It is this case, both in reference to the difficulties I have had to contend with, and the facilities afforded by adopting the correct view under which muscles act, which has convinced me that there is a doctrine applicable to muscular action that has not hitherto been alluded to.

I have seen cases where the dislocation has been that of turning the plantar aspect of the foot inwards, the fibula being broken with other injuries of the parts; but these cases have been produced by a crushing of the parts, and therefore come under another division of injuries.

Occasionally we have simple fractures of the tibia which extend into the joint: in these cases the bone is, as it were, slit upwards, separating the internal malleolus from its shaft. These require no other treatment than that of the above case; but it is right to enjoin the young surgeon that the utmost care should be taken that the foot be retained in a perfect state of repose, which can be hardly done upon an inclined plane; and therefore the lateral position is the only one that should be adopted in these cases.

Many cases occur where the metatarsal bones are broken. A weight falling on the upper part of the foot is the common cause: it is detected by a nice tracing of the bones. The patient of course must suffer greatly, as it is only a great force that can break bones so constructed to resist injuries, and consequently the contusion is great. No apparatus is required, as the bones are readily retained in position, and the pressure only adds to pain.

The phalanges of the toes are occasionally dislocated: and the manipulation for reducing them is not by powerfully pulling on the displaced bone, but by bending it, and adroitly turning it into its place. In short, the same management that I have proposed for the reduction of the phalanges of the fingers is to be followed for the reduction of the bones of the toes.

Females are very apt, in falling backwards, to injure the os coccygis. If the patient is of advanced age, and the joints anchylosed, the bone is broken. This accident is said to occur more especially in females, because the ischia are wider apart, and thus the tuberosities do not protect this bone. If the tuberosities protect the male because they are nearer, so would they the female if the os coccygis projected no further. In the female, however, it takes a larger sweep, and stands beyond the line of the tuberosities, and thus is more obnoxious to injuries. This is a most painful accident, and the patient suffers most distressingly whenever the bowels are acting. Quietude, and the gentlest means possible of easing the bowels, seem the only treatment permitted to the surgeon. The period of suffering is shortened by the patient keeping in bed ; when, after a short endurance of the pain, she becomes quite easy and well.

I have said much in favour of treating fractures with the least possible restraint and without pressure of muscles; I must therefore set my face against that plan which has been suggested, of applying weights to keep up permanent extension. I have formerly seen this practice much used, and witnessed how fully it kept up constant irritation and action of muscles; causing them to contract, instead of inducing them to relax.

The material out of which one part of pathological science is to be constructed is probably the knowledge of those new functions which living structures can set up under the influence of a power which may be regarded as conservative, and which we find developed by the very disturbance which some natural function has received. I have already alluded to the sanative effect which the stimulus of a particle of dust excites when under the eyelid. (When I allude to this fact, I only mean to show the resources of nature, and not to interfere with the proper practice of removing the particle as soon as possible by art.) The surgeon, seeing this resource of nature, is to adopt only those measures that will conduce to her carrying out her own operations, and to avoid every interference of officious practice. The mucous passages offer many cases to illustrate this position.

I have seen a portion of the ear of barley slip into the nostril with the stalk-end foremost. Of course the least touch of a body so formed, in such a situation, must add to its further intrusion. It produced considerable irritation for a day or two, which then went off, and quickly after it came quietly away, coated with thick mucus, without any effort. This short history explains the practice to be enjoined, which is, indeed, negative, as in the case of the particle under the eye-lid. The irritation it set up was to establish a new conservative function, it was to clothe it with a thick adhesive mucus, more substantial than the common secretion of the part; yet still it was mucus, that it might exist as a secretion to which the structure is adapted, and on which it might act simply as a stimulus for its expulsion, the excitement being just sufficient for the purpose. It passes out in the quietest way, not even causing sneezing, or any effort of the patient. This explanation of the course nature adopts under such circumstances points out the line of treatment the surgeon is to follow, which is, indeed, negative. He is not to injure the parts with his forceps by unnecessarily repeating attempts to extract it; he is not to allow of any effort of sneezing or blowing the nose, with the intention of its passing off in this way. He is to require that the patient should be very quiet, that the substance may be kept in one situation, so as to acquire the coating as soon as possible, by which means the substance will be soonest ejected.

I have seen a case where a small piece of a leaf of a vegetable had got into the ventricle of the glottis; it caused very much irritation and coughing for some hours, but it was soon enveloped with mucus, and came quietly away the next day. It has never happened to me to have a case of a foreign body in the trachea; but should such a patient come under my management, I should not think of making an opening into the trachea to extract it, provided it was under one condition, that is, that it moved up and down in the tube. Recorded cases have proved that this operation is not necessary. But I should not only reverse the present practice in this point, but in others. My purpose would be to get the foreign body clothed with mucus as soon as possible. To attain this it requires that the body be kept stationary; and to ensure this as much as possible the patient should be kept in bed or perfectly quiet; he should avoid all effort to expectorate, and very soon, I have no doubt, the body would easily pass off. I have further to notice, that in this case we have evidence that the functions of life often oppose the principles of statics; for I infer that the foreign body would be less likely to pass out if the patient was placed with his heels upwards than when he was sitting up, because the process of expectoration is a function most easily carried on in the erect position of the body. I have said as a condition it is necessary that the body be moveable; of course a pointed body, such as a pin, does not offer the probability of being under the same favourable circumstances for ejection.

Both children and adults are in the habit of swallowing pins and needles. As these, of course, may produce the most serious mischief, it is right to remove them, if possible, up, which I have done sometimes by means of a hook: if this can be got below the body, and the hook includes the body in it, this happy event may result. On the common principle of bodies in motion, when a pin or even a needle is free, it must move with the blunter extremity forwards; and therefore in the present case, if the hook acts to move the body, it must bring the head of it towards the pharynx, and it will, perhaps, be discharged. If the same body be pushed downwards, it is the head which will be moved in that direction. It is in this way that needles pass to various parts of the body, and also that the swallowing of them is attended, for the most part, with so much less evil than might be anticipated. I had lately a child of five years old, who had swallowed a needle about two inches in length, but the point was fixed into some hard berry. In a few days it passed away very quietly in a motion; of course, the globular body at one end hastened the passage of it.

The practice of surgery presents to us the resources of nature of ridding parts of the presence of extraneous bodies by the means of the stimulus of relief. In cases of hemorrhage the surgeon plugs the nostrils. The efficacy of the operation depends upon the lint he uses being tightly pressed into the posterior nostrils. So it remains for a few days, and then if the surgeon withdraws it, he finds it free from all stricture; indeed, so loose, that it will, perhaps, discharge itself into the pharynx. The bulk of the wadding is the same as when tightly introduced; and so far from having lost any of its parts, it has acquired an addition in the thick mucus with which it is saturated. The fact is, that under the influence of the stimulus of relief, the internal nares have been quietly enlarged. A child was brought to St. Bartholomew's Hospital with a pebble in the meatus of the ear. I found it of an oblong form, and firmly wedged in. I could get the blades of a small pair of forceps to grasp it when passed over the short diameter, but I could not make it stir. Having the fear before me of doing mischief by using force, I directed the mother to bring the child in a fortnight. She did so, and I found the pebble quite loose, so that it might be removed by only a shake of the head. The body was coated with cerumen, and of course interstitial absorption had been going on under the influence of the power of relief setting it free.

The analogy of the terms of the proposition I have laid down is seen in the usual treatment of a common ulcer in a healthy state. The surgeon wipes away the pus from the part, and places upon the sore a piece of dry lint. This gives uneasiness for a short time; it then becomes lined with healthy pus, and its presence is no longer felt; it acts only now as a layer of pus, the usual covering of the sore: but it has called forth an excited action to increase the energy of the process of reparation; for the stimulus has only amounted to that of relief. Thus the slight action of this piece of lint is an agent for promoting the healing process. If the pus were not wiped off from the sore, the application of lint would hardly amount to the stimulus for relief, which sets up the best means for carrying on the steps necessary for healing healthy ulcers.

In the case of fistula in ano, after the operation the surgeon inserts a piece of lint to prevent the parts divided from healing by adhesion, as the edges of the cut are compressed together. This is quite right. He goes on inserting the lint, which produces a very slight irritation, and he soon finds that the lint does not remain in the gap, but comes out and lies upon the external parts. He may doubt whether, as the lint does not remain, it really does any good. But he should regard this as a proof that there is a powerful exertion for healing going on; and if it is thrown off in a few hours, so much more may he be assured that the process of repair is more fully carried on. Respecting the application to ulcers, we may be assured that whether it be mere lint or a stimulating lotion, whatever pain it produces at first, if it soon goes off, there is a reasonable expectation that the part has sufficient powers, and is secreting healthy pus. The one or the other soon gets clothed or lost in the congenial secretion, and the temporary excitement is sufficient to keep up the healing action. Thus in calculating the agencies in the hands of the surgeon we must bring the part or the whole into the most tranquil and equable state possible, and then throw in our aids for advancing, and keeping up power. But the great point in practice is to reduce to a state of tranquillity all the functions, whether of parts or of the whole system, before we call into action our auxiliaries for increasing power, otherwise these last only add to disturbance and the waste of strength. Bearing in mind these few and simple principles, the surgeon may place himself in a commanding position to meet the circumstances under which a large class of diseases exist. When an excitement is set up that is inordinate for the purposes of reparation, this is to be brought down to the utmost degree of tranquillity, and then we have the power of raising the curative process, by adjusting the stimulus to the due and responsive evidence of its influence.

The consideration of the influence of stimuli upon living structures, implies the adaptation of the powers, and the nature of the relations of them the one to the other. The knowledge of relations is the completion of a system ; and the whole animal economy is a collection of all the systems or functions accommodated amongst themselves and combined into a whole. When an injury is inflicted, for the purpose of repair a new function is set up, which must interfere with the order of the combined functions, and disturb the whole system; but the principle of accommodation soon brings this contingent function into the orderly state of being one of the whole system. It becomes so quietly associated with the whole collections of systems that it subsides into the condition of an ordinary function. When disturbances are produced, and extraordinary functions are called into action, these will become associated with the natural functions, sinking into an equal tenour with them, so that the character of the whole system becomes that of health. But when the injury is restored, the whole system imperceptibly relieves itself of the extraordinary functions that have been brought into operation.

There is necessity, in ordinary states, for the observance of repose, in order that the full and equable powers of reparation may be developed; and as this often necessarily infers the repose of the whole body, I must advert to what is the consequence of this state being implicitly complied with. It seems an accepted opinion not only of the great mass of people, but of the bulk of the profession, that remaining in bed destroys health; but the value of this opinion must be placed in its true light. If health mean the mere muscular power in the usual exercises of the body when free to move, then some countenance may be allowed to this opinion. Certainly the muscular subject cannot vault into his saddle, or throw the quoit, after being kept to his bed, as otherwise he would have been able to do. But if health mean the orderly exercise and equable succession of those functions of which life is made up, then I have reason for thinking that with some precautions health is very well maintained in bed. I have often known patients to have been in bed not only months, but even years, and I have observed that all those processes which present themselves as marks of health are present. I have seen patients, after having been in bed some time, enjoy their food with an appetite to which they had been unaccustomed, sleep unaided by sedatives in a more than usually composed manner, the natural relief of the bowels being regular, and the skin performing its functions uninterruptedly. In short, these patients have been in the very best state for the agencies to repair imperceptibly the disturbances from injuries, and other causes. Without the repose of bed, the surgeon often would idle away his time, waste his resources, and inflict suffering upon his patient in the greater number of his cases. The prejudice against this treatment has arisen from the fact, that patients are generally sent to bed with a wasting disease upon them; and when the period of convalescence approaches, they attribute to bed that weakness and debility which is the consequence of the complaint for which they were consigned to it.

As the practice of surgery, in a great degree, is made up of the cognizance of disturbances, and of the new functions required for their reparation, so it presents to the surgeon's notice the different qualities of endowed life. We see in the influence of stimuli, and in the exercise of the functions for relief, varieties which can be only referable to these differences; so in the multitude of children burnt or scalded, we find a vast difference in the effects produced by the same power of heat. Of course in scalds with boiling water, where there is a limitation in the intensity of the heat that produces the mischief, there is less variety in the degrees of injury, and this usually does not go beyond the production of vesications, still sometimes a thin slough is produced even in adults, and more often in children; but in denser fluids, such as boiling beer, coffee, soap-lees, this kind of distinction almost always follows.

I must here remark that the practitioner is to distinguish between the naturally weak constitution and that which has been impaired by excesses in living. The former will never rise into a state of vigor, yet it will carry on the processes of reparation quietly and steadily, and will respond to the influence of the aids for improved action. But the impaired constitution, the result of continued irregularity, renounces the full influence of the powers of medicine and diet. We often see patients with such a state of constitution suffering from great injuries, who for some weeks are kept alive by brandy and other stimulants, but who ultimately sink, although the wound has advanced towards reparation, showing by this that it is really the absence of vital powers, and not the presence of irregular local actions, that causes the fatal result. This state of impaired constitution, brought on by excesses, when the additional energies are required to repair injuries, is almost always marked by impairment of the functions of the stomach.

If this organ does not favourably respond to the aids which a generous diet can supply, cases of severe injuries are generally fatal. If the patient survives to the period of the suppurative stage, stimuli will help to carry on the processes adapted for restoration ; but they will not sustain the powers engaged in this work to the end. There is no direct relation between the progress of the local reparative process, and the improvement of the tone of the constitution ; the former may appear very slowly to advance, while the general powers of the patient are even declining. It is not long since a female about thirty years of age was brought one night into St. Bartholomew's Hospital, who had, whilst in a state of intoxication, been run over by a waggon. The integuments of the elbow and the whole of the fore-arm were torn away, the bones crushed, and the muscles lacerated. I amputated the limb whilst she was frantic with liquor. She was got through the first stage into the suppurative process without difficulty, for the stump did not unite by adhesion. An abscess had formed in the thigh at a part where she had been much bruised. With all these local actions the system became tranquil. The process of healing went on in the stump, but the power of her stomach never came round: she had really never any appetite in spite of the usual administration of tonics and stimuli, with the trial of every kind of diet. She died with the stump covered with a delicate cicatrix. The tongue was not amiss, but the pulse gradually became weaker, until it could not be felt.

In slight injuries the system is barely called upon to put forth its powers; but in serious ones the disturbance of the system is so great that every aid is required to re-adjust it. Great local injuries produce great general disturbances, and thus there arises a state of the constitution for the grave consideration of the surgeon. This has been called the power of the shock upon the nervous system. The death of infants occurs from teething sometimes. The surgeon knows that infants will sometimes die immediately after operations. The brain suffers quickly from local irritation at this period of life; and if the brain suffers, all the secretions at once are altered, and a fatal reciprocity of influences is established, so as to destroy life. In infancy there is the greatest development most actively going on, and therefore there must be the greatest injury sustained by any infractions of these powers. This is an age when the disturbance of the combination of the manner, of the order, and of the measure of functions, acts most powerfully on the integrity of the whole system. In children we have the means of keeping that irritation off which depends upon the disordered secretions. No operation should be performed on them without immediately emptying the bowels.

If two children, the one weakly and the other robust, are both vaccinated, we find, cæteris paribus, that the development of the disease, which is, in fact, the measure of the powers that respond to stimuli, bears a close analogy with the constitutional vigor of each; thus the inflammatory appearances of the areola and the fever in this stage being much greater in the robust than in the other. These analogies are so obvious and so consonant with our notions, that in all injuries, taking along with us the quality of the injury, we may assume that the vivacity of the excitement caused by the local disturbance is a measure of the vigor of the constitution. But in proportion to the vigor of the constitution, so is the power of resisting the changes which local disturbances can effect upon the whole. The vigorous system will be excited into more active exertions, because it has a quicker and a steadier power for effecting re-adjustment. But if, on the other hand, the constitution does not respond with vigor, the vital energy being too low to exert necessary action, and to resist the first invasion, it will probably be powerless to fulfil all the purposes of restoration. These are principles in surgical practice to be borne in mind in settling the points whether a patient with compound fracture is or is not to be bled; whether cases of very great injuries to the limbs do or do not require amputation upon the instant, &c.

In these grave cases an imperative duty devolves upon the surgeon: he has to detect, if possible, the character of the constitution; he has to scrutinise the patient's pulse, not only on the first moment of the injury, but almost every hour, at least at short intervals, to decide its state, and then to decide whether there is action sufficient for the purposes of the coming demands. What he has to wish for and to expect is, that there should be some expression of what is called sympathetic fever. This is really a state that we know indicates a vigorous constitution, and one which will, when subdued into tranquillity, best throw out its power for repairing an injury: and so far from being that fever which has been placed as a fearful object in the scene, it is really a hopeful event in the first three days of an injury; because it assures us of the powerful coadjutor we shall have in all the processes that are to ensue for the benefit of the patient. It is the absence of this excited state in the circulation that should alarm the surgeon; it is the weak, the fluttering, unsteady pulse that should impress him with danger, and raise in him the fear that he may expect gangrene or other miseries that may afflict his patient.

In all serious injuries the constitution is invaded in proportion to the magnitude of the injury; but the way in which the constitution may meet this invasion is widely different according to its state. The one presents a ready front and encourages a hopeful result; another displays its weakness, and calls for the most watchful care. The circumstances that imply health in a general sense are tranquillity of the nervous and of the circulating systems. To produce this state, the secretions must be natural : these functions being deranged, the digestive powers are impaired, and nourishment does not go on. If the vigor of the constitution is so defective as not to be roused to an excited movement, in order to sustain, and then to raise and adjust, its forces for bringing out the new functions of reparation, it must sink under the derangement. It is thus that the surgeon has imposed upon him the greatest responsibility in watching his patient for the first three days after serious injuries, where wounds are inflicted. If in twelve hours, or earlier, the pulse does not indicate increased action, if it becomes fluttering and unequal, when the surface does not seem to evolve heat; when the countenance is listless, and perhaps when the patient reports himself better than it might be expected; and particularly if he is not clear in his answers, but is wavering, then that best of all stimuli, brandy, is to be thrown in, and if there be delirium, opium. The necessity of actual nutriment must not be forgotten. This method must be pursued, and moderated, as the indications point out, until that period arrives, which is the great proof that tranquillity and orderly processes are commencing — suppuration. This process is the striking index that the functions are assuming an appropriate arrangement for reparation, and that the system is resuming that tranquillity by which the restoration will be carried on to completion. The surgeon hails good suppuration as fulfilling a period that is to remove his doubts, and secures a victory over the approaches of a gangrene that was threatening his patient. I may safely say, that for many years that I have followed up these principles, I have never had a case of traumatic gangrene arising from severe injuries that has not stopped. Of all the subjects that come before the surgeon for prompt and decisive conduct, this is, I am convinced, one of the most important. It is an opportunity for science to step in and save life; it is a demonstration of the ability to decide the agitated question of immediate amputation or not. It is the exercise of a convincing practice much beyond any proof derived from arguments. I am convinced that by adopting this course of watching the expressions which the constitution shows during the first three or four days of the first stage of very serious injuries, and by throwing in brandy, when the indications demand it, that there can be no occasion to amputate on account of traumatic gangrene.

Some years ago, the French surgeon, Baron Larey, advocated the practice of amputation in cases of traumatic gangrene. This opinion seemed to be adopted in this country as a settled point, and the Baron was set down as an authority too great to doubt the soundness of his judgment. But the cases he gave, which were saved after the operation, were, by his own account, so preserved by the administration of brandy. By his own admission, the gangrene was the consequence of some violence impairing the powers of the constitution; and by what reasoning he conceived another shock could restore the strength of the system, or could raise its powers to meet the imminent invasion it had already endured, is to me surprising. It is, in my view of the question, an unfeeling practice to assail the patient with a repetition of attacks upon the powers of his constitution, which one has already lowered, and which practice the very intended argument does not support. Drawing conclusions from my own practice, and from that which I have seen in others, I cannot conceive such a proceeding at all justifiable. It is till the termination of the third day, the period during which the constitution of a patient under serious injuries is on its trial, that the surgeon should feel all his anxiety excited to watch the progress of the local injury, as well as to keep up the circulating system to the point of efficient action. It may often happen that the slightest movement may rob the patient of his security, when made before the termination of this period. I have said three days as the period before the hopeful moment arrives of the establishment of fair suppuration in the wound: when this is effected, the surgeon knows he is now advancing in smooth waters, and has a clear course to follow. The period of agitation is passed, and the time of quiet proceedings is arrived. When suppuration is established, we know that the constitution is tranquillised and settling down into regulated actions, and arranging its powers for receiving into its combined movements the contingent function, which is brought into action for repairing the great local mischief. All the elements of new and primitive functions are associated, and proceed in equable order to complete the integrity of the whole, by the adjustment of parts.

I cannot review a long course of the practice of surgery without reflecting, that very many lives have been lost by not following the practice indicated by the principles which are now advocated. I have no hesitation in saying, that life and death rest upon the treatment of serious injuries during the interval of the infliction and the establishment of suppuration. We may recognise in that condition of the constitution in which the formation of healthy granulations and good pus is going on, adequate powers not only to preserve the functions of life, but to sustain the energies required to complete the reparation of injuries.

The course then that the surgeon pursues in all great injuries with wounds is to keep in view, that the great violence in the part is a concussion or shock of the whole nervous system, so as suddenly to impair the secretions, and therefore to depress the powers of life at the moment; and to leave it so depressed, that if the individual have a low state of vital powers, it cannot be roused without aid to the endurance of the first derangement, and to commence the adjustment of new functions, for which the constitution must exhibit, or be made to exhibit, the necessary degree of vital energy.

The duties of the surgeon are therefore laid down for the treatment of these cases. He is bound to watch narrowly the power of the heart, to keep the circulation equable, and up to a healthy state of action. He is also to adopt every measure to secure to the nervous system the subsidence of agitation into repose, in which state alone he knows that the important functions of life can carry on the appropriate processes for its due maintenance. He is to direct his attention to bring back the secretions to the standard of health. By bringing about all which he knows that the processes for reparation may be engaged in his service. I have mentioned that I regard brandy as the great resource for sustaining the action of the heart in these cases: I consider it, beyond all comparison, the best means. Some years ago, I tried the comparative efficacy of it and ammonia, and the superiority of brandy considered was exceedingly marked. We want more than mere stimuli, we want that strength which nutriment can alone supply. We want, as early as possible, the restoration of the digestive functions. If there is a medicine that impairs the stomach more than another, I consider it is ammonia; which should, in this state of things, be avoided. I am often quite surprised to see practitioners giving this medicine in cases where the tongue is dry, harsh, furred; the pulse quick and irritable, and the secretions all at fault; but I am not surprised that the patients do not improve under such treatment. It is just that which is calculated to weaken the stomach, and to impair the secretions in a greater degree than the influence of the injury could do. The plan best adapted for restoring the secretions is the use of mild preparations of mercury with antimony. At all times there is an absolute necessity for keeping up regular evacuations where the secretions are bad; a plan which some think weakening, but I know to be necessary actions for preserving health. By a management of this kind, I repeat that I have not, for very many years, had occasion to resort to amputation on account of traumatic gangrene. I have many times seen its approach, the ashen colour, the puffiness of the part, and the general state above alluded to; but by the prompt treatment I pursued, this state has passed off, and the patient has had a limb saved, and life preserved.

Judging from the description given of that condition of patients, under local suffering, which has been called hospital gangrene, I really have never seen in St. Bartholomew's a case that clearly seemed, in my comprehension, to coincide with the appearances given of their state. Besides those cases ready to terminate in traumatic gangrene, I have had very many where slough to a very extensive degree, or gangrene, occurred; but which were quite of another class of cases. In the one case the surgeon discovers the faltering condition of the circulation; in this latter the state of the general powers presents the character of unyielding strength, and he reposes in the efficacy of such an auxiliary as this to confirm him in his course of proceeding. The former state is a consequence of the inability of the system to cope with the efforts required for its safety; the latter is an expression proving its competency to go through all the processes of reparation. There are many cases where a limb has been crushed, and severe wounds inflicted, and of course the violence produced has destroyed, or at least greatly diminished, the vitality of the part, and circumscribed gangrene or death has been produced in the parts. This, of course, will vary in extent and degree, in proportion as the violence producing the mischief had varied, and also as the actual vigor of the patient may have differed; but this still may go on without inducing that state which is understood by the term traumatic gangrene.

There are continually most severe cases of very considerably contused and lacerated wounds in the hospital, in which, by bearing in view the distinction of their being in a constitution which has power to carry on the preliminary processes of reparation, I have been enabled to save the limb that has suffered. They are not those cases that should be termed traumatic gangrene, but are cases in which, although gangrene may take place, it is only of parts whose vitality has been destroyed by the violence actually inflicted on them, and where the gangrene has not embraced other parts, which it does in the defective state of the general powers. These are cases where the mischief extends only to the local injury, and where the powers of life are deranged, but have not lost any of the energies they are called upon to exert. The surgeon should here feel that he has the privilege of administering means of assistance, and of leaving to future events the exercise of his judgment for saving the limb, or at least of so saving such parts of a limb as may be of the most valuable service to the patient. I have reason for thinking, that very often limbs have been unnecessarily taken off under the impression that the cases were traumatic gangrene, when the real case was only sloughing of integuments, or other parts, arising from the exceeding violence locally inflicted, where there was a state of good and regular health.

I shall again add, that a new function for reparation having been once set up, the whole system readily associates this function to the others, when occasion requires. Many years ago, I had a patient in the hospital with compound fracture of the leg. He suffered much, and was long in a precarious state, but he ultimately went out quite well. In no long time, perhaps in two or three years, he met with an accident, by which he had a compound fracture, in very nearly the same place, of the same leg. I recollected the circumstance of his former precarious state, and was then fearful of the event. But he had hardly any general disturbance, and the result was, that the bones united, and the wound healed, with not any more derangement, either locally or generally, than a common sore on the leg. He soon left the hospital quite well. Analogous instances often occur, and the surgeon should bear in mind this view of the principles upon which they rest.

There is a series of very severe injuries that do not present, in full features, that remarkable power over the constitution which I have attributed to injuries attended with wounds. They are injuries where the parts suffer immensely, but the system is not powerfully assailed, and called upon to exhibit the condition of its powers. In the very many severe contusions which occur at St. Bartholomew's Hospital, when the integuments are entire, I have found the influence upon the constitution to be very much less than where there are wounds, although the extent and the violence inflicted are the same. Thus I have seen a limb severely contused, and all the muscles exceedingly bruised, yet the system has been but little disturbed, and rest has been sufficient, with very little other treatment, to restore not only the part, but the general state. Every now and then, I have had cases where the wheel of a vehicle has gone over the thigh, and produced immense swelling, the fascia lata being distended to the utmost; of course the pain has been excessive, and the whole aspect of the limb has been most formidable. I have concluded that these were cases where veins had been ruptured, upon observing the progress of the first three days. The patient suffers much pain, but yet the pulse is neither indicative of great loss of blood, nor of any great excitement. Often, on the second day he has some relief; and on the third day he is decidedly better, the pain is much less, the pulse quiet, he has slept, and the state of the limb is relieved of the great tension. The ruptured veins having poured out blood enough to distend the fascia, the pressure thus produced is sufficient to close their openings permanently; and as no more blood is effused, the absorbents soon diminish the bulk of the mass, and thus the size and tension are diminished and all pain ceases. I have, in the course of treating these cases, after a certain time made an opening through the fascia, and scooped out an immense quantity of coagulum ; the cavity suppurated, and after which, the parts soon healed ; and the patient perfectly recovered. This effused blood presses also on the artery, so that the arteries of the leg may not be felt to beat. But the marked changes that take place on the third day clearly prove that the blood is not from an artery ; for an artery would go on bleeding, and the tension would not so completely go off. The patient suffers throughout very little constitutional disturbance.

Very often we have in the hospital somewhat similar cases, where a waggon has gone over the legs, and broken the bones, as well as ruptured a vein ; but the test of the third day declares that the great tension has been owing to a rupture of a large vein. As the pain and tension subside, then this fracture goes on as well as other mere broken legs. I adduce this as an instance of that difference to which I have alluded, between a great injury with wound and one without, in reference to the influence on the general system. I do not include in this description those very severe injuries of bones and deep parts, where the magnitude of the injury of them is very great, and where the degree of violence to the integuments is apparently little.

Hospital practice affords a considerable number of cases occasioned by persons being knocked down by waggons, and the wheels afterwards passing over their feet or hands. In such I have often found that, whilst the surface shows but little appearance of being injured, the deeper parts are most severely suffering. This may well deceive the surgeon. The external marks will of course vary, as the intensity of the injury of the deeper structures; but the striking symptom is, the degree of pain being so much beyond what might be inferred from the external appearance, more particularly the increase of this pain after the third day. Among the first signs is that which always accompanies the inflammation of the tarsal and metatarsal, or the carpal and metacarpal bones, which is the puffy swelling both above and below, but particularly on the under part, and on those surfaces where the injury was applied. In these parts we have not only the bones, but a vast collection of fibrous structures of a low organisation; and when these structures are injured, we invariably find this puffy swelling in the part over them. But owing to the circumstance of the low organisation of the parts, we of course find that the advance of the inflammatory action is slower than those of more perfect organisation. Thus we often find in these cases not much to discourage the surgeon's hopes until the third or fourth day, when the inflammation advances with aggravated pain to the patient, until the powers of the part are overcome, and slough of the surface and destruction of the deeper parts relieve him of these sufferings.

I have adduced these cases not only to show that we may be often deceived in the estimate we make of the degree of violence that has been done; but also that in these injuries we may not find all the relief we hoped for after the lapse of the first few days, at which period, in cases of severe wounds of soft parts only, the patient is often placed in comparative safety. These are cases of the most anxious kind, and which call for the exercise of the best judgment.

There is in the occurrence of severe injuries a state of things actually very different, yet perhaps apparently not so, to the kind of cases above described. It is that of injuries where the integuments are not wounded from without, but are really lacerated or torn from within outwards. Thus, suppose a blunt portion of bone, either by means of fracture or of rupture of ligaments, is so far displaced that it is pushed from within outwards, and that, by first stretching the integuments as far as their elasticity will allow, it then makes a rent; I say that this wound made by overcoming the elasticity of this structure, is perhaps even more disposed to heal than the cleanest incised wound. The fact has been virtually acknowledged in the case of the compound dislocation of the foot outwards at the ankle joint. It has been remarked, that these cases do well beyond the expectation of the surgeon, bearing in mind the struggles he often has to contend with in other wounds, and in mischiefs of deep parts. This kind of wound is effected at the ankle joint when the deltoid ligament has given way by the internal malleolus first stretching, and then bursting through, the integument; which, in such circumstances, generally exercises its elastic property so much as to grasp tightly the projecting bone. This quality of elasticity is a power which helps exceedingly the process of union, by closing the wound in a way that no art can equal. When we let out the fluid of a hydrocele, the scrotum is distended; when the fluid is evacuated, then the corrugation of this structure closes the wound incomparably beyond any contrivance we can apply; and it heals without attracting our observation. In wounds of the lungs the air in the cavity of the pleura produces by its elasticity, better than by any means we could adopt, an effective pressure upon the collapsed lung. I have seen cases of children where nearly half the scalp has been torn off by a force, not first inflicting a contused wound on the lacerated part, but stretching and rending the flap from the other parts, where, when it has been cleansed and laid accurately in its place, the edges have almost all healed by the first intention. I have seen the tarsal bones violently separated, and the astragalus pushed through the skin, when the wound has healed readily, and with the least possible general disturbance. In short, this way of causing a wound in the integuments, seems to inflict upon the part only the first degree of disturbance; that is, to induce the simple action of immediate relief. Of course, in stating these cases, I assume that the conditions are not exceeded; that is, that there are no violent contusions also added to the rent.

In stating that there is a marked difference between severe injuries in the first period when the integuments are comparatively but little affected, and in those where they are much injured, I approach to the consideration of that difference which we find between simple and compound fractures. Amongst the many cases of broken legs continually occurring, there are those of both these classes in which the degree of the violence and the mode of its application are so nearly equal, that the presence of an external wound must be regarded as the essential characteristic of the compound fracture. This injury has not of late years been so formidable to the surgeon as formerly; and I can safely say, that it has been very rare, for many years, that I have had occasion to amputate for such injuries after I have judged the case one for preserving the limb. I have already said that it is necessary that the surgeon should acquaint himself as much as possible with the manner in which the injury has been produced, not only that he may form some estimation of the force employed, but also of the direction in which it was applied. Thus I need hardly say that the force may be applied to the part broken, or to the extremities. Thus, if a carriage pass over the leg, we have a vast contusion of the parts, and perhaps a crushing of the bones, but no displacement to any amount; yet we have a complexity of derangements, and a protracted process for recovery. If the force be applied laterally, then we have to refer to this in reducing the bones to their places.

I have already, when speaking of simple fractures, explained my views on the best method to be adopted for reducing bones, when broken, to the proper state of co-aptation. In regard to the measures to be employed for the purpose of adjusting the bones in apposite and proper position, I firmly believe that it is more to the ultimate advantage of the patient that the bones should be left in an irregular form, than that the limb should be stretched and pulled about for any length of time, to give it an appearance adequate to the surgeon's views of accuracy or neatness. Many lives, and still more many limbs, have been lost, by carrying on persevering efforts in opposition to the action of muscles, which, without effecting any good purpose, have added to the derangement, and suspended the operation of the powers of accommodation from adapting structures to circumstances.

It is to be borne in mind that the wound produced with the fracture is not a simple wound through the integument. It is really, for the most part, a very large wound, much deeper than the integuments; all the parts around the bone are torn and detached, and therefore even if the integument heals, there is, out of sight, much to be done. As an abstract question, it is of little consequence if the external wound be large; as by being so we get a freer way for the discharge of the pus, know what is going on, and have more insight of what is required for the treatment. But yet, if the wound in the integument be very small, then the bones have not been much detached from their adjoining soft parts, and the external wound may heal, as I have once seen it do. When the bone is powerfully forced out through the wound, then so large a laceration of the parts is made, that it is vain to suppose an union any where can be formed in the interior of the wound. In such cases suppuration will ensue, and it is for the benefit of the patient that this process should come on as quickly as possible.

In these cases all the contrivances of varnishing the wound are idle, and perhaps worse than useless, as it is a step that may delay the accession of the best process we should hope for—suppuration. It is then in proportion to the laceration of muscles and by the implication of other structures by the application of the force, that the magnitude of the injury is, in a great degree, to be measured. And if these be many and great, it is quite fruitless to waste ingenuity or time, in contriving means for procuring primary adhesion. In the amputations of limbs I have performed, I have often succeeded, by nice adaptation of the wound, in procuring adhesion; but have not infrequently been disappointed by one part of the union soon giving way. There has been that disturbance or violence impressed upon the deeper structures, that, whilst union has been going on at the surface, the suppurative process has been established below; and this event will take place in spite of the gentlest offices of careful surgery. It must be much more so, where the great violence inflicted upon the part is capable of breaking a strong bone. And on this account I have said that a large external wound does not necessarily increase the difficulties of the case.

An obvious element in estimating the powers of nature for repair, in cases of compound fracture, is the extent of injury done to the periosteum. It is this structure on which we repose our confidence for the restoration of the bone to its functions in the economy of the limb. If this is seriously injured, the reparative processes for placing the bone in a restored state are defective, perhaps lost. The extent and numbers of the future exfoliations will be probably regulated by the primary injury the bone receives. If we have an uninjured periosteum, with good surgery the recovery will go on well, when once the reparative processes have commenced, and if the constitution of the patient be moderately tranquil, and not absolutely depressed. In calculating the powers of the periosteum in this case, we view one of the most splendid endowments of the animal structures. We see that a colourless membrane, almost without feeling, may at another time, being the very same tissue, become most vascular, and therefore most acutely sensitive. It is converted from a thin transparent film into a fleshy substance of the highest order of vitality, throwing forth the most active powers for the formation of new bone. As in cases of necrosis, so in fractures we discover that this is the character it assumes. I have many times in comminuted fractures seen pieces of loose bone where the periosteum was left sound, connecting them to each other, which have ultimately been consolidated together.

I know of no part of practice where there has been so great a difference of success in the different periods of surgery as in the treatment of compound fractures. When I entered the profession they were always cases of the greatest anxiety, not only for the safety of the limb, but also for the life of the patient, usually with bad results; but now, when once the series of actions is brought into a satisfactory and orderly train, the result may be generally anticipated as favourable.

Compound fractures of the leg are amongst those serious injuries that, by their great local derangements, invade the constitution with disturbances of the most formidable character. In hospital practice, more particularly, we are suddenly brought in contact with a most grave case, whilst we are totally ignorant of one of the most important elements required for forming a just estimate of the course we ought to pursue, and of the prognosis we might be able to form. We know nothing of the habits of the patient; we know nothing of the artificial life he may have led; and almost every man leads a life beyond the mere necessary conditions implanted in him for support. Our inquiries almost invariably lead to the knowledge that the patients have been addicted to the free use of spirituous liquors. Delirium tremens, which formerly was rare in hospitals, is now common. And the stomach readily unfolds its depraved condition, when the general system has received a severe shock. Thus, besides the degree and the quality of the local injury, we have need, in order to exercise a sound judgment, to know the habits of the individual.

I have already adverted to the position, when speaking of simple fractures; and when the wound will allow us to place the limb on the side, I am convinced of the advantages of this way of placing it.

The bent position seems to be that which is most in the order of nature for the economy of the limb as a whole, to leave undisturbed those influences which the preservation of functions may have over the reparation of parts. The limb lies in a greater state of repose — the bearing is diffused more equably — it is kept in a state of quietude by less apparatus or restraint, which are always most injurious in interfering with the freedom of the circulation in the parts, than in any other position; and in addition to what I have stated before, the limb in this way is less influenced by the movements of the body. The limb being placed in the best position the surgeon can obtain, it is then, unlike the simple fracture which may be daily rectified from any errors of position with impunity, to remain most perfectly undisturbed until the suppurative stage has commenced. No circumstance should induce the surgeon to disturb it at all, till then. Such a step will often be equal to a deadly blow, carrying with it destruction of life. The surgeon is not to busy himself about the unsatisfactory arrangement of the bones, whether in the crookedness or the twisting of them. The safety of the limb, and the preservation of the life of the patient, are of infinitely more importance than his having an unsightly limb, and every less evil must yield to the best means of preservation.

But whilst he urges the absolute necessity of insisting upon the quietude of the limb, he has other demands upon his attention and anxieties. He must keep the closest watch upon the pulse, and promptly throw in stimuli, if, as the hours advance, the circulation does not rise to what we call sympathetic fever. But whether the responsive powers induce this state of fever, or we force them up to the point, we are to bring the secretions to as perfect a state as possible: the disordered state of them is the great index of the change that has for the time been effected on the system; and the restoration of them is the first notice of the approach of the orderly progress of all the functions, and of the establishment of suppuration. When the suppurative stage is established, then the limb may be safely looked at, and re-adjusted with comparative impunity; but still with careful observation of the effects of the changes that have been going on. No officious meddling should be allowed, so necessary is it to keep the limb free from all offensive interference. We find that if a compound fracture be put up in one position, and it be soon changed to another, the alteration produces pain and disturbance, both local and general. A case occurred of compound dislocation of the ankle-joint, in which erysipelas had supervened, and the internal malleolus became denuded, and necrosed, from the loss of its periosteum. A suggestion adopted was to saw off this portion; this local jarring produced great disturbance generally, and the patient died. The case had previously been doing exceedingly well.

By closely watching and arresting with stimuli the failing powers, the period of suppuration arrives; but here we sometimes find that, instead of the free and healthy formation of granulation, the wound puts forth no sign of vigor, but looks inert, and covered with an orange-coloured deposit. Concurrent with this state of the local derangement, we find that the secretions are bad, and that the patient has no appetite; that he is sleepless, and uncomfortable in his feelings; he is really in the very first onset of erysipelas. The surgeon has time for arresting the advance of such an attack; but this is only to be done by promptly directing his attention to securing a return of the healthy state of the secretions: every other intention should give way to this one. If this be effected, he will see a free secretion of healthy pus from the wound, and a return to comparative comfort of feelings, to appetite, and to vigor. But when that state is present which we call sympathetic fever,—that state which is really the measure of the powers of the system for carrying out the processes for reparation in great injuries,—then this vigor of the constitution is capable of encountering the trial it has to undergo, and we have little to fear. This active state is usually transitory, and is only a step towards the recovery under very great derangement. We have the power of moderating this sympathetic fever, if necessary, by the means of depletion. The powers of the individual are, by judicious management, capable of undergoing all the increased energies required of it, when this vigor is indicated by sympathetic fever.

Having arrived at this first and important stage in the treatment of compound fractures, the limb may be now cleaned, examined, and moved into a more fitting position, if required, and that with comparative impunity. The duty of the surgeon now resolves itself into the business of keeping the system tranquil, attention to the quality of the secretions, and the raising and maintaining the powers of the stomach, that it may take and digest aliment.

The wound requires the assistance of some stimulus active enough to call out the energies, but not so great as to exceed and destroy the powers of the part. Thus if the suppuration be good, and the granulations rising, it is of great use to clear, by means of a syringe, all the cryptæ of the wound, with a mild lotion. The solution of sulphate of zinc is about the best that we know of to begin with.

As misapprehension or delay may render powerless any treatment to avert the fatal state of gangrene, I shall revert to the indications of its approach. Its peculiar features are not always so soon discoverable as to be recognised in twelve hours; at all events, they assume a marked form before the period of suppuration. Early in the course of this time, we notice irregular action of the heart, the pulse does not rise as it should do; in the state of sympathetic fever the artery is soft but dilated, weak, and its beats are fluttering and uncertain. The tongue is coated to a certain degree; the expression of the countenance agitated, and unsteady in its direction; and the sensorium seems faltering in its powers. The patient does not clearly understand his real state, and usually declares that he feels well; he does not sleep much, and is wandering when he does. The wound is dry, and the parts about it assume an ashen colour, with the feel of puffiness in the parts about it. The judicious practitioner must watch his patient narrowly, and he will then seize the moment of early threatening, and apply the means in his hands, and will perhaps be able to avert from the attack by providing against these portentous signs. I have already spoken of the preference I have to brandy above any other stimulus, and the dislike I have to ammonia. The last medicine has a direct injurious effect upon the secretions, and is calculated to keep back the stomach from recovering its functions. We must bear in mind that the accomplishment of the final healing will be very mainly through the maintaining the powers of digestion.

If the soundness of the constitution be unimpaired, we find it often happen, when all the functions are tranquil and orderly, and the processes of reparation are going on, that the powers of the stomach are increased, and appetite and digestion are improved beyond that of ordinary health. We must never forget that, in the animal economy, power necessarily follows tranquillity, and that without this state of tranquillity, we can never expect a return to health. If we can arrive at the possession of the means of restoring a disturbed state to an orderly and tranquil one, we have the means of employing aids for raising the power. In all cases where we have a tolerably temperate liver as a patient, we may assume that if we have in great injuries secured tranquillity in the exercise of the functions either original or contingent, we have placed our patient in comparative safety.

But in estimating the qualities of injuries and the powers the surgeon can bring into action, he has opposed to his expectations a most formidable obstacle that may beset him, beyond all foresight, in his calculations; that to which I allude is the very common discovery that the patient has a lurking disease in some organ, which the disturbance the new injury has produced, rouses into the active exercise of its morbid tendencies; and both now combine to oppress the general health. The lungs, the liver, and the kidneys, in post mortem inspections, often prove the cause of the failure of our operations. When we find a wound, either after an injury or an operation, looking reasonably healthy, and yet the patient lingers with an irritable quick pulse, &c., we know that, besides the external wound, there is another source for a fatal result.

I have insisted, in the cases of simple fracture, on the propriety of getting rid of all apparatus for restraint, as soon as the bones are firm. I press the observance of this practical point still more urgently in compound fractures, in order that the limb may have that freshness which exposure will give, and the circulation be left as free as possible, as well as to lessen the duration of those influences that will interfere with the powers that muscular action can impart.

If on the fourth, or even the fifth day, we are disappointed by seeing this orange-colour showing itself on the sore, and the general state I have described as the character of the erysipelatous condition, we have now a mid course to select for our practice, and yet, in my mind, it is not difficult, as the very spirit of our operations should be bent upon securing and effecting a healthy state of the patient's secretions. I have always seen a free perspiration and the restoration of the rightful action of the liver, &c., at once cause every symptom to cease. I have noticed the remarkable fact, that under these auspicious circumstances, the almost sudden change of the tongue and pulse to a natural state has taken place, and at the same time the quick subsidence of the erysipelatous inflammation has followed. The first course to be pursued is, to direct our efforts to restore the secretions, and at the same time to support the patient, as much as can be, by the mildest nutriment; but not to introduce stimuli, except the patient be very low. We have too much action, and too little power. Wine, &c. add to the action, but do little to give power to the system.

Without entering farther into the treatment of erysipelas now, than so much as refers merely to compound fractures, I feel assured, from long observation, that the means of stopping it essentially rest upon the power we have of restoring the secretions to a healthy state; which is, in fact, to restore some most important functions to their orderly course. Some years ago a medical man was seized with a sore throat: this was transferred, from the mucous membrane of the fauces, to the skin, and he had as bad an erysipelatous attack of the whole head as well could be: two physicians attended him, and very sincerely believing it the best practice, as indeed it was so considered at that time, concurred in ordering bark. The patient was so far sensible that he understood what they had prescribed, but he dreaded the trial of this medicine. He crept out of bed, and went to a drawer, where he knew there was some hydrarg. cum cretâ, of which he took a large dose at random. In a few hours he had a most healthy motion, and all the symptoms were improved: being susceptible to mercury, the next day he felt a slight tenderness in his gums; all the functions of secretion were restored, and the characteristics of erysipelas had faded away. The tongue became clean, the pulse tranquil, and the stomach very soon accepted and digested food: the patient was quickly convalescent. I place the greatest value upon mild mercurial and antimonial medicines.

But even if we get the patient out of the erysipelatous state, we are left to see the damage which its attack has made upon the parts, as well as upon the whole system; the state of the constitution immediately before and after the attack, differ in a great degree even in the mildest cases. The excited state being over, the convalescent stage is that of great comparative depression; and a nice management is required to guide the patient into perfect health. But the parts locally suffer so much that their condition is rendered very much worse than they were before the attack, since all the weak structures, having a vitality unable to resist the active excitement, suffer: thus the cellular tissue and fascia are sacrificed, the loss of which, in the ultimate healing of the wound, is attended by the worst consequences to the use of the limb, and therefore to the comfort of the patient, as then all the structures, particularly the muscles, become involved in the cicatrix; a condition of things productive of continual annoyance. I need hardly allude to the observance of all those cautions that I have insisted upon, regarding the rest of the limb, in the first stage of injury.

It was formerly a favourite practice in the treatment of compound fractures, but a most pernicious one, for surgeons to seize any portion of bone that might project, and saw it off. Happily, a better scheme of treatment has been entered upon, although I have lately seen much mischief resulting from so unnecessary a step. The predominant principle in the carrying on such cases is, to secure unbroken quietude, and to leave the natural processes to go on without inflicting any violence, or deranging their course. In removing a piece of dead bone, we cannot always succeed in taking away every particle; any part, however small, may keep up the same irritation by its presence; and thus no relief will be obtained by the operation, but positive injury may be produced. All the bone that is injured will, in due time, duly and quietly exfoliate.

The compound dislocations of the ankle-joint may be classed with compound fractures. I have already spoken of the great points of treatment in enlarging on the compound fracture of the leg. We have here an instance of the benefit of placing the leg on the side: we see the relief afforded by placing muscles in that position in which their actions are least called upon. The way in which the integuments are ruptured causes them to grasp the protruded bone; a very slight enlargement of the wound allows the bone to be replaced. The wound heals altogether better than in other cases of compound injuries, being made by the bone first stretching the integuments to the utmost before it is pushed through, and thus no contusion has been produced. These injuries have often the most satisfactory termination, even beyond the expectation of the surgeon.

Compound fracture of the thigh is by no means so common as that of the leg. As this part of the limb is more enveloped by muscles, so we must have a larger amount of torn and contused soft parts. Thus a greater mischief is produced, requiring more energy in the power of the constitution to support the first demand upon it; and therefore I conceive the attendant ought to be, if possible, more alive to every indication of failing strength. The period before suppuration is established, is most momentous in these cases, and the closest observation is required to meet every change. But this period being over, if we find that all the combined functions have subsided into a steady course of action, then we have the advantage of the seat of injury being nearer the centre of circulation, by which the powers of the system are greater for sustaining the demands that are required. But the injury is nearer the centre of gravity of the individual; therefore there is not the same security against the communication of movements to the broken bones.

We must bear in mind, in forming a prognosis of cases of severe injuries of joints, that the result is by no means proportionate to the extent and degree of the mischief produced. A carpenter, at work on the roof of a house, fell to the ground, on his knee chiefly. He was brought to the hospital, and I found that the integuments of the knee were torn off, and the patella was broken in several pieces, of which some were removed, so that the joint was completely laid open. I decided to preserve the limb. He went through all the disturbances, both local and general, for the first few days, when, suppuration being established, all the derangements subsided, and the parts quietly continued in the regular course of reparation, till the wound was quite well; and, except the privation of the motion of the joint, he had a very good limb. This case must incite us to meditate on those circumstances in which the safety of such a case may differ from those miserable results which mere punctures particularly produce in the same part.

Compound fractures of the arm are by no means infrequent. I have had very many under treatment, and they have turned out well, usually giving not much anxiety on account of the little general disturbance they produce on the constitution. The upper arm is not much bedded in muscles, and therefore there is in such cases less local derangement. This limb being nearer the centre of circulation than the thigh, it is better circumstanced to keep in a state of quietude than the other. I may here state that I have never seen a case of compound fracture of this bone that did not unite, nor indeed of the femur, under the same injury.

Many cases occur in the hospital of compound fractures into the elbow-joint. I have always found these cases less formidable than the same injuries in the lower extremities. I have had lately a very severe case, in a gentleman who was thrown from his cab, while driving. A vast deal of injury was produced by the violence, and his state was for some time imminent. He, however, quite recovered, with the joint stiff, but with a very useful hand.

I have had a vast variety of compound injuries of the fore-arm, and of the most formidable kind. The numerous occupations which are carried on by means of machinery afford a large class of severe injuries that are brought to the hospital. These cases, besides presenting an extensive laceration of the integuments, are often attended by fracture of the bones of the fore arm, crushing of the carpal and metacarpal bones, and wounds into the wrist joint: the fingers are particularly subject to the same sort of injuries. These are cases requiring great consideration, on the subject of saving the limb, or not, or of saving some part of it.

One of the great points in the injuries of this limb, that should guide our prognosis, is the situation of the chief injury. Thus, if the back of the fore-arm be torn up, and even if the bones be shattered, the limb may often be saved, and the patient ultimately enjoy the comfort of a useful member. The vessels and nerves lie on the front of the arm, and if these be but little injured, the whole power of vital energy is preserved to the limb. Moreover, the muscles at the back are of less power, and therefore of less importance, if the limb be deprived of their use ultimately. But even if the chief injury be in the front of the fore-arm, provided the whole series of muscles and the bones be not entirely smashed, and the surgeon finds that the thumb and one finger can be saved, and the muscles, that is, of the thumb only, exist in a state to be capable of acting when the wound is healed, then so much of the hand should be saved. I have often secured to a patient a very useful hand in such severe injuries.

A vast number of cases present themselves at the hospital of accidents and diseases of the fingers; and these are particularly interesting, inasmuch as by good surgery very many hands are preserved in a useful state, which otherwise would have been perfectly useless, or which would, perhaps, have been condemned to amputation. I regard these cases as very fully bearing out the great importance of repose, and that it is of essential consequence that every considerable case of inflammation of these limbs should be be kept in bed; all those means adverted to, for bringing on and advancing the suppurative process, should be carried out. Erysipelas is one of the states of derangement usually present, and which is only to be treated on the principle of restoring the secreting functions. I have so often seen severe injuries of the joints of the fingers turn out well, that I am induced to repeat the injunctions already laid down of procuring every means of keeping the part quiet. It must be recollected that these joints are, by acting under the influence of each other, apt to be very unremittingly in action, although the patient be desirous of doing his utmost to prevent motion; therefore something in the form of splints is required. I shall add, that in wounds of these parts, when the granulations are well formed, the best result ensues from using the pressure of a roller; and further, the influence of the nitrate of silver is very marked in urging the process of healing in these cases. Cases constantly occur where these joints are so far diseased as to have the articular surfaces quite rough from absorption of the cartilages, and the ligaments loose, yet they have acquired the known change of leaving the bone converted into a hard and smooth surface, at the same time that the lateral ligaments become adapted so as no longer to admit of the lateral motion, which was the case whilst the disease was going on.

The periosteum is, as I have before said, that structure to which we mainly owe the power of repairing the injury of broken bone; and in compound fracture, we have the opportunity not only of witnessing the change in its condition, but also the happy results of such changes. All that is admirable in the series of changes in the gravid uterus, or, what is more to the purpose, those of that order of things which is so striking in the formation and the shedding of the deciduous horns in the deer kind, is, if any thing, still more remarkable in the series of changes and succession of functions which the periosteum can take on. The film-like membrane, the periosteum in its natural state, appearing to be of low organisation — so low in sensation that it hardly shows signs of feeling in amputation, when the stimulus for repair is brought into full operation by the subsiding of all derangements into the orderly course of new functions — is then endowed with the power of passing into one of the most exquisitely organised structures of the body. It is then highly vascular, and acutely sensitive, and fleshy in its substance. It is now abounding with life, and full of activity for the purpose for which it has passed into this state. When the surgeon is thus aided by this astonishing machinery, he is imperatively called upon to do all he can to keep up its productive energy, and he is to do nothing that can interfere with the healthful process. But how few are there who view with tenderness the quiet but effective operations that are going on! How many cases are spoiled by restless interference!

The cases of diseased bone which present at the hospital are very numerous. It is possible to assign conditions in the state of the parts that may lead to a clear distinction into classes. But, probably, necrosis is essentially an affection of the periosteum in its various changes, and in the result of those changes upon the bones. The influence which seems to me to have the greatest sway in causing periostitis, is cold and wet, when the parts over bones are exposed to these impressions.

A gentleman built for himself a large house, and constructed a bath next to his study. His delight was to bathe, even in cold weather. The room was not secured from drafts; and one day, in cold weather, he sensibly felt, whilst uncovered and wet, the blast pass over his right shoulder. He suffered most acute pain in the upper part of the humerus, with general swelling of the limb, and still greater pain when the deeper parts were pressed. He soon came to his house in London, and ultimately recovered, even without the formation of abscess; but the thickening of the periosteum, which was left when the general swelling was removed, certified the nature of the attack.

An elderly lady seated herself in a garden chair after rain; afterwards she felt great pain in the seat. Some months after I saw her, and found a sinus, and at the bottom a small piece of necrosed bone of the ischium.

I have been able to trace the attack very often, in the children of the peasantry, to their lying about in wet grass. The attack is always that of acute inflammation, but varying much in degree; and the constitutional symptoms are often very severe—so much so as often to make the nature of the complaint doubtful. The course of the very acute form, is to pass on to suppuration, and the pus may be formed under the periosteum, but also sometimes in the interspaces of the muscles, and of course always under the fascia.

I am not able to decide whether the very acute attack is that which terminates most readily in the healthy functions of reparation. At all events, there are two states of periostitis changing the condition of the bone in two ways: the one where the whole energy of the periosteum is called forth, where the increased action subsides into a transitional state of the membrane, so that it assumes the greatest display of formative capabilities, by which it executes, unerringly and promptly, its conservative protection to the limb. The beauty and the efficacy of its accomplishment must strike all with admiration. This is that state which has the name of necrosis properly applied to it. The original bone is dead, and the periosteum commences its new function of supplying an equivalent by enclosing the dead with a living case, which is to be at once a new and perfect bone as well as an immediate substitute. The rapidity of this formation is proved by the almost sudden shifting of the attachment of the muscles. The bulky muscles of the limb, which at one moment are attached to the old bone, are at another connected with the new structure, and not the smallest interval is known to pass of their being unattached to either. The muscles suffer no moment to elapse in which they cannot move and support the limb. All their insertions remain in perfect order and integrity.

This is that state of necrosis where every provision is made for the ultimate state of perfection of the limb. The wall is quickly strong enough to sustain the weight of the body. In its construction, in order to guard against that very overcoming pain, which only one drop of matter pent up in bone produces, openings are left in the walls, and also in the integuments, for the escape of it. With the aid of such effectual powers of reparation, the sequestrum goes on to be detached. All this may require a lengthened time to be perfected. Notwithstanding the vigorous proceedings going on for the safety of the limb, injudicious surgery will often spoil the happy work that is advancing. I have often seen an operation executed which has done nothing but give the greatest pain to the devoted patient, and loss of blood produced in cutting through the periosteum. I am clear that it is quite futile to attempt any operation, except the sequestrum be quite detached; for if the least part be still connected with the living bone, this keeps up nearly as much irritation as the whole sequestrum.

But the persisting powers of reparation do not terminate in detaching the sequestrum from the living parts; they carry on the work to eject it from its case. In speaking of the cloacæ, I might have said that it would be expected that these should be found at those parts where the muscles are not attached. The same provision is observed in the skull, if matter form slowly upon the dura mater; in venereal necrosis especially, the bone is perforated by many openings, so that the patient suffers none of those evils that occur in accidents of this part, where the matter is more quickly deposited. In furtherance, then, of relieving the limb from the sequestrum, I have seen cases in which, when this has been quite detached, and one end of it has been near an opening, at the same time that the opening has increased in size, the end of the dead bone has protruded into it, and gradually started out, and becoming ultimately completely dislodged. I have often watched a sequestrum in its advance, and been able to appreciate its daily alteration in position, so quickly has it taken place; still more, with equal rapidity the new bone has subsided into its diminished and proper size, as the sequestrum was discharged. These are beautiful examples of the powers of nature. Why then may not the surgeon leave some operations to her better workmanship?

These cases also prove that there is a power, besides muscular action, which can put in motion parts of the animal structure. I have very often seen, as I before said, the necrosed bone, day by day protrude with such surprising rapidity, that each day's work was quite apparent. I have seen the greater part of a tibia, which when once started into the opening, has been quickly and completely extruded. I had a child in the hospital, not long since, about four years of age, in whom the whole femur, from the condyles to the head, came clear away. It is gratifying to see, that as the dead bone projects outwards from its case at the one end, so, at the other end, the new bone at once, and rapidly, resumes the lessened bulk and form of its proper dimensions. This child, very quickly after the sequestrum was quite discharged, was able to run about the ward. There can be no doubt that there are powerful agents, which can relieve the animal structures, and expel offending bodies without the intervention of muscular motion. We have several analogies in the course of pathological observations that carry with them the truth of this principle. Even in many of the mere exfoliations of bone, where it is well buried in deep parts, the exfoliated portion will rise and appear at the surface of the wound. Its presence becomes the stimulus for its extrusion, just as the particle of dust from under the eyelid. It is an example of the simple stimulus for relief. In all the varieties of necrosis, the surgeon is called upon to treat with caution and reserve the case, if he weighs duly his responsibility to the patient.

There is a form which sometimes occurs of a tedious and intractable nature. It is that in which the bone appears outwardly diseased to no great extent, but the examination of it with the probe detects the interior, or cancellous parts equally, or even more, diseased than the surface, the whole part being very painful; and the process apparently going on, presents no indication of being that which I have designated as a function for relief.

The disease will go on in this course for years, and present none of the salutary processes for restoration to health. As the pain continues uninterrupted the patient's constitution suffers after some time.

Cases occur where the effect of periostitis has been to leave the necrosed bone under a different condition to that of a complete incasing of the dead portion. The cases I allude to are when the disease has its seat in a considerable portion of the posterior aspect of the femur or tibia, which are discovered by the probe completely deprived of periosteum; this membrane not seeming to take on the processes necessary for the formation of the bony case, but remaining unchanged and inactive in its powers. The provision of leaving openings for the escape of matter is maintained by the formation of sinuses through the fascia and integuments. The front aspect of the bone, or the opposite one to the diseased, is thickened and increased in bulk, in order to keep up the strength of its structure. As the dead bone does not become encased by a new formation, so the excitement to throw off this part is probably less: the period at which it is got rid of, is, as far as I have observed, very uncertain. I believe that when this dead portion exfoliates, or is detached, that the deficiency is not repaired, and a degree of deformity remains in the bone, because the increased bulk in the opposite side is permanent. Perhaps, as the bone is made effective for all the purposes of the limb in its economy, so there is less activity called forth for completing the reparation.

The alterations in the periosteum, which I have been adverting to, have terminated in producing positive death of bone. I have now to notice a state of the periosteum, which only so far alters the bone as to give the semblance of disease of it; but this really is not the case. This is a state of things which has not been noticed, as far as I know, by any one. It is a state of the periosteum which consists in an alteration totally different from that where all is life and animation. This state is, on the contrary, that of little vascularity: the structure is thickened and become indolent, and when cut into, gives the sensation of parchment. In all the cases that I have had to treat, it has been the result of blows, but not of severe ones. The blows have not been of that kind as to induce the sufferer to pay much attention to them at the time, but yet quite enough to fix upon him the remembrance of his having been hurt upon the part. The disease is slow in developing itself, and is hardly attended with pain at first; but this, however, gradually comes on and increases to a degree that it is quite severe, although the apparent mischief seems so slight. In its further progress a very slight rising is felt, and the pain is increased on pressure. The derangement produced in the part seems hardly enough to call forth the excitement to the function of repair.

Some years ago, a gentleman applied to me, with a small swelling on his forehead, which had gradually become very painful, so much so as to incapacitate him from attention to any subject requiring application. He remembered having been overturned in a mail coach, three years before. He was little hurt any where, but was struck on the forehead: a few months after he felt some pain commencing in this part. He now complained bitterly of his sufferings, and a small swelling was to be felt in this part. He had been under treatment for two years. I made an incision through this thickening, which was about the size of a shilling; the periosteum was thickened, and bound tightly over the bone, which was quite rough, and full of excavations. I fully regarded it as dead to a certain depth. The pain was immediately removed, and in three days the bone began to granulate; in a fortnight the wound was healed, and no exfoliation took place. The patient, in every respect, was quite well. This case made a strong impression upon me, as I fully expected there would be exfoliation, and that all the tediousness of this process would follow.

A barrister, going one of the summer circuits, had his daughter with him, a child about twelve years of age. He had her on his knees, when she struck him with her country-made shoes on the shin. He felt but little of the blow at the time; but several months afterwards pain began to arise in the part, which increased to that degree that he could neither get rest nor fulfil his usual engagements, which, in consequence of his professional standing, were very numerous. I detected a slight thickening of the periosteum, about the size of a horse-bean, and cut down through the thickened part. I found the periosteum thickened, and tightly bound over the bone, which was rough and excavated with depressions. I was in this case enabled to assure the patient that there would be no exfoliation, that the bone would granulate, and that the wound would soon heal. He at once lost all pain by the incision, and was soon well enough to resume his attendance in court.

I had a patient placed under my care in the hospital, whose complaint was, as he represented, very severe external pain in his head, of long standing. On examining the scalp, I found that there were certain spots, which he felt exceedingly tender, and I detected in these parts the most trivial rising of the pericranium. On inquiry he informed me, that several months before he had been beaten about the head. I now knew precisely the character of the complaint, and immediately cut through all the raised parts that could be discovered; on doing which he was immediately relieved of all pain in those spots — the bone was rough under each, and the pericranium like parchment. On the next day he pointed out to me one or two other very small places, and having experienced the great relief from the preceding incisions, he begged to have these divided. This was done, and they all quickly healed; and in less than a fortnight he left the hospital quite well.

This is essentially an alteration in the structure of the periosteum only, the bone merely suffering by implication. When the extent of the altered periosteum is of large breadth, then the bone loses, in some parts, its vitality. If, on the one hand, the general feature of the injury is not to injure the bone primarily, so, on the other, I have not seen these cases occur when blows were accompanied by wounds; so that the force which effects the mischief seems to expend its power upon the periosteum. We have frequent instances of observing that, in the infliction of injuries on the body, the impetus of the force may be expended on different structures lying in the line of the direction of the force, and not necessarily on all, or any one especially.

The state of a living structure lying loosely over dead or inactive subjacent parts, as it occurs in practice, always gives rise to great pain; and as it is a pain not arising from actions calculated for relief, and for the restoration of the part, so it is a pain remarkably oppressive and injurious to the whole system. I have often seen living cutis vera lying loose over inert sores, very painful; by dividing this isthmus of skin passing over and stretched across, the pain instantly has ceased. So a piece of skin merely lying over a part of necrosed tibia, has been relieved from all pain by dividing it. This little operation expresses, in fact, the great relief afforded by the division of the integument of carbuncle; but another principle is involved in the efficacy of the treatment of that case.

There is yet another state of the periosteum that I think proper to allude to. I have very often had to treat a chronic form of periostitis, which is hardly noticeable in its accession, and slow in its progress. I think the most common seat of this is in the femur just above the condyles, and also above the same processes in the humerus. These affections may be mistaken for disease of the neighbouring joints, particularly that of the femur, which is often set down as disease of the knee. I have no reason to suspect them to be of venereal origin; very often I have been convinced they are not. They affect the patient's health much beyond the importance that might be affixed to the local malady. They rarely fail to yield to the administration of iodine and a moderate quantity of blue pill. The advantage I have observed to be great in the use of the latter medicine; before the adoption of iodine, I have generally seen the cases yield to mercury; I therefore give it a place in this treatment.

It is not unusual to have the integuments about the lower end of the fibula diseased, accompanied by an ulcer, and also by a thickening of the periosteum under it. This state is probably the effect of slight injuries having been received on the periosteum, and unnoticed at the time. The sore is apt to be tedious in healing, but the whole disease has appeared to me to be favourably influenced by iodine.

The strong fascia embracing the muscles of the extremities appears to differ widely in its vital powers from the periosteum. The latter seems to have the power of altering its conditions to a great degree, and in all its states retaining its properties. The fascia has, by far, less vital power, and in any excitement of an active character is readily destroyed. It is a membrane of important use in the muscular economy of a limb. It is, indeed, the integument of the muscles, and if it loses its healthy state, the flexibility and vigour of these moving powers are seriously impaired. It is that medium which is required to preserve structures that are formed for motion from being impeded by all the many injuries and imperfections that may happen to the integuments. The loss of a small portion of it in the leg leaves an imperfection distressing to the patient, although the accompanying sore on the surface may have healed.

The fascia seems to be a structure little capable, when injured, of rising into the process which may be termed the function of repair; this bespeaks the low degree of organisation it possesses. It is on this account, probably, that injuries of it so readily lead to a destructive progress, and therefore require the most delicate management to avert bad consequences. The slightest puncture of this structure will often be followed by inflammation and extensive formations of matter; its construction being to give power to the muscles under it, so an injurious influence is exercised in its injuries by their action. Inflammation of the fascia in the first stage, like that of all deep fibrous structures, produces a blush on the surface; and when this occurs, although no other symptom presents itself, the formation of matter under it may be calculated upon. In the slightest injuries of this part, the strongest injunction should be given that the limb should be preserved perfectly motionless. I have seen the point of a penknife, by falling out of the hand of the patient and puncturing the fascia in so slight a way that he was careless about it, and walked as usual, afterwards lead to a lengthened confinement to the bed. It has occurred to myself, after the removal of a bursa from over the patella, that the fascia of the thigh was invaded by the most violent inflammation, terminating in sloughing and extensive suppurations, with the most intense pain; altogether producing a state that endangered the life of the patient. I have been witness to a case in which death did follow the removal of an old bursa, the operation having been quickly followed by the inflammation of the fascia.

In the most moderate form of inflammation of the fascia, the suppurative process is always likely to follow; and as this inflammation always takes place on its internal surface, there may follow adhesions which will cause imperfections in the motions of the limb. But these will not last long, for the provision for securing the functions of structures provides a still delicate tissue to allow the muscles free play. The knowledge of the fact, that so important a part in the economy of muscular action readily takes on a sloughing form when excited, imposes a serious responsibility on the surgeon whenever the fascia is interested in the operations he undertakes. I have seen a simple and small incision into it lead to a considerable loss of it; and have known cases where a long incision has been carried through it, in the management of phlegmonous erysipelas, cause the loss of it in the whole of one side of the leg. I was called upon, not long ago, to give an opinion in such a case, in which the tendons of the peronei muscles and the extensars of the toes were laid quite bare. These structures preserved their vitality, and would have been efficient for their intended motions, if they had the covering of fascia; but without this, they, in the healing of the sore, formed one mass with the uniting medium, and were of course fettered by the cicatrix.

Cases occasionally occur of a chronic form of diseased fascia, which is generally seen about the upper part of the thigh on the outer side. The character they present is that of thickening not only of the fascia, but of the integument over it, with ulceration, to a small extent, of the cutis, in which there are sinuses leading down to the diseased structure, which is felt by a probe to be thickened and rough, and offering no sign of bleeding, however roughly the exploration may be carried on, and the sinuses themselves secrete hardly any thing, and what they may do is not pus. These are obstinate cases: of course the sinuses will not heal whilst there is disease at the bottom. The really efficacious treatment is the division of the thickened fascia; but the little apparent external disease, and the depth to be cut through, are obstacles to getting the consent of the patient for such a step. The division of this thickened fascia seems at once to be the excitement for that process which is really the effort for reparation. There are other cases of some disease about the fascia which equally causes induration of the tissues over it; which, probably, is an early stage of the preceding. I have adopted, in many of these cases, a division of the diseased part, and often, I believe, with success. A slight thickening often gives rise to a small collection of pus, which, of course, calls for an opening.

Many cases occur of a form of disease which seems an equally altered state of the subcutaneous tissues, and of the cutis with it. It is a painful affection, very slow in its advances, and very irregular in the changes that take place, and it does not always observe any continuous course. I have generally tried incisions, but not with such success as I anticipated; yet that step is useful. The surface always in some parts ulcerates, and in doing this, the ulcer extends very often through the cutis to the structure beneath. This tissue is often thrown off in the form of a slough, or of a core, as the patient describes it. These cases almost always occur about the knee, sometimes about the elbows. The subjects are usually females.

I have not collected any proofs that this disease has a constitutional cause, although it often occurs on both sides of the body. I have found that the best local treatment consists in the application to the part of alteratives; merely soothing the parts does little. Of course, rest is absolutely required.

Furuncle, or boil, is pathologically an important subject for investigation, as it certainly advances a step towards the inquiry into the conditions of carbuncle. I have often seen carbuncle and boils accompanying each other; the essential quality of each is the slough, however small in the boil, of the cellular tissue. In the boil we have this core surrounded by textures of vigorous life, and therefore it terminates in an abscess of a slight character, and the surface of the cutis opens to discharge the slough. When this is removed, the sore quickly heals.

Boils run out into a consecutive series, and go on following each other to a lengthened period; and during this time of their prevalence, we find that the least stimulus will bring them out at the place irritated. Thus, if a piece of adhesive plaster be applied to keep some dressing over one boil, it is followed by others at the part the plaster covers. The seat of boils, as of carbuncles, is most commonly on the back. Furuncle then, as well as carbuncle, seem the result of some affection in which the skin particularly is the subject, and that part of this organ which may be considered to have the lowest degree of vitality, which is the case in the back. It is most probable, that in the physiology of the system of digestion and the elimination of the urine, may be found the origin of this affection. In urticaria, and various other affections, we recognise the connection of these organs with such states. I have found that if boils are large, the division answers; but if small, they are best left to themselves.

The surgery of carbuncles has been a long while settled; and in it we have, as in some other cases, a most decidedly beneficial practice handed down to us, without knowing, I believe, to what benefactor we are indebted for it. In the explanation of the natural history of carbuncle, we must place in a prominent view the state of the stomach; but to fix the precise character of the affection of this organ has not been arrived at. If the disease is found more commonly in the class of persons who luxuriate in dainty living, yet it is often seen in the hospital amongst those who cannot command indulgences. It has been said that luxurious feeding tends to it more than drinking. I have found in those cases I have had in the hospital, that the patients have invariably been addicted to drinking. The stomach is repulsive to food, and unfitted for the assimilation of the aliment that is offered to it. And co-ordinate with the defection of the stomach in the association of vital functions, the pulse is small, weak, and irritable, and the nervous system very excitable. The secretions, of course, as a part of the series in the train of the other symptoms, are vitiated; the whole machine is under excess of action, but with defect of power. That this is primarily the beginning of carbuncle is proved by the successive re-appearance of the local disease, which seems to imply a constitutional cause.

It has been generally accepted, that the vital powers are deficient in carbuncle; and it has followed that practitioners, possessed in their minds with one leading point, have commenced the treatment with stimuli. We see it is very much the case, in the practice of the profession, to leave in shade all the collateral circumstances of a case which, if wisely appreciated, would give a more correct adjustment of means, and a more accurate exposition of relations, in conducting treatment.

In carbuncle, I am convinced that the practice of at once throwing in stimuli is not the best proceeding. The chief derangement which we are at first to combat is the irritable state of the system, and the first object we should have in view is to soothe and to tranquillise. The administration of the saline medicines seems, as far as I have observed, to be by far best adapted to bring the stomach to a state for soonest exercising its functions, and therefore of making the pulse steady, and of moderating nervous excitement; with a very careful employment of the mildest nourishment. I have found by this means, in a very few days, almost in a few hours, tranquillity has been obtained, and the commencement of the restoration of healthy functions. When the powers of the stomach are brought round, little is left to be done. It is only then that such restoratives as quina can be endured by this organ, and perhaps then it is hardly requisite.

This complaint is marked by impaired powers of assimilation in the digestive apparatus, and of course the secretions become vitiated, and therefore the nervous system is deranged. In the language of Hunter, it is a state of excess of action without power. It is a state which we find to be accompanied by very weak powers of action, particularly in the subcutaneous tissues, and where the power being unable to support this excess of action, the part either dies, or goes into ulceration. And it is quite possible that a cause so slight as not to be recorded in the memory of the patient may fix the disease in that very part in which it occurs. As in boils, so in carbuncle, the occurrence of the local affection is generally seated in the back. In the incisions to be made in carbuncle, two conditions are to be observed: the one is, that they should go to the bottom of the slough of the subcutaneous tissue; the other is, that they should include the full extent of the inflamed skin; for if these directions are not attended to, the inflammation will still go on extending, and a repetition of incisions will be required. After this operation the usual advice has been, to apply strong stimulating applications to the part at once, but I regard this as injudicious treatment: the part has laboured under considerable action with weak power, and as soon as the incisions have been made, by which the pain is immediately relieved, the parts should be soothed into tranquillity by mild applications. It follows, that as the parts have been under great action with low power, when the action has subsided, the power is still of the lowest kind, and the reparative function cannot be strong. Thus the granulations are apt to be flabby and weak, and they require caution to be observed in the application of stimuli, when used to increase the vigour and vivacity of them. On account of the long continuance of this weak power, carbuncles are frequently a long while before they heal. The circumstance of the pain being so quickly removed by the incision, is agreeable to what I have before alluded to,—that when living parts lie over dead ones, they always produce great pain, and that this is instantly relieved by dividing them.

The result of my experience has led me to believe, that when the stomach is irritable and indisposed to take food or to digest it, saline medicines are best calculated to restore its powers, giving it an appetite for food, and gradually reinstating the function of digestion; and they will effect these objects when mere tonics will not, and indeed will only add to the disturbance of the organ.

We continually see small carbuncles begin when a large one is already formed, and there will occasionally be other small ones succeeding in the neighbourhood. The irritable kind of inflammation so fixes on the cutis and substratum, and the organisation of the cutis is able to resist destruction, whilst the weaker-endowed cellular tissue is, in this respect, powerless, and sloughs. Though the skin has not sloughed, it yet has not the power of repairing the mischief, by throwing off the deeper sloughs. But some exertion is made by it of meeting difficulties, and it forms openings by which any matter that may be secreted has a way to escape. The incisions rouse the powers of the part to more effectual exertions. That injury which a clean incision of the cutis makes is, for the most part, as seen in our daily practice, an appointed stimulus for the effusion of lymph, and therefore always indicates an effort for repair, however untoward contingencies may derange this course. When this effort is shown, we have the assurance of a step made for reparation.

In the division made in a carbuncle, we have an instance where the patient, although writhing under the pain of a severe gash, yet confesses that he is very completely relieved from that painful burning which the disease causes. There must be some direct association between the sensibility of the cutis and the stimulus of a simple incision, and thus the instantaneous change from the pain of carbuncle to the mere smarting of a clean wound. It is really a fact that the incision converts the derangement leading to destruction into the function for reparation. Occasionally there occur small carbuncles in the limbs; they are never large, and get well, but they go on increasing, and equally require the incision. I have had very large carbuncles to treat, but never saw a patient die of the complaint, except when it has been in the head. There must in this, as in most complaints, be a reciprocity of actions between the local mischief and the general derangement of the system. The effect of the incision is most marked; it has the power of immediately tranquillising the part, but particularly of diverting the actions from the diseased to the sanatory state, and of thus relieving the system of its embarrassed condition.

I have had many opportunities of treating those previous abscesses from which fistulæ in ano are formed. In that mass of adipose substance filling up the ischio-coccygeal space, the patient's notice is perhaps drawn to a deep tumor, just differing in substance enough to be clearly distinguishable from the surrounding structure, of a doughy consistence, little sensible, and not at all rising to the level of the surface. This is, I apprehend, the first abscess in its earliest state, which, if allowed to go on, will end in the genuine fistula in ano. I have had such cases in the hospital, and have no doubt that this is the fact, as I have compared these sort of swellings with other presentations in a more advanced stage in the formation of fistulæ. The practice to be adopted is unhesitatingly pointed out: this lumpy mass is to be transfixed; and this I have done the very first moment the case has been presented to me. I plunge a knife down to the very centre of the mass, and then I have found a small quantity of pus come out; and upon passing my finger down (and the opening should always be large enough to admit this part), I have found in the centre of the mass a small cavity, of the peculiar pulpy feel that is familiar to surgeons as the interior of an abscess. This prompt measure stops all further progress of the abscess, which otherwise would lead its way either to the rectum or to the surface, and terminate in fistula. The course of these abscesses, when opened, is to close and finally heal; but the surgeon must not expect that they will heal with the readiness of ordinary active abscesses. He must recollect that they are seated in a structure particularly indolent, and little assailable by ordinary stimuli; and these, when used, must be applied to the bottom of the cavity. The stimulus of the division of the cutis does not extend to the deep parts, so that the external portion of the wound is inclined to heal long before the deeper structure is disposed to commence this function. This abscess, if left alone, does not exclusively lead either to the surface or to the rectum, but advances simultaneously in both directions. When the fistula is complete, the sinus, being relieved from all irritation, makes no exertion to set up a process for repairing the imperfection. Where there is an indispostion in parts to respond to stimuli, there is equally a power of endurance in submitting to the derangement: thus, when the abscess has opened in the one or the other direction, but more particularly in both, there being a free exit of all secretion formed, there remains no re-acting power to throw forth any curative function for fully restoring the natural condition of the parts. Thus the fistulæ remain for a long while inert and uninfluenced by all the usual stimulating applications, and the processes for restoration seem to have terminated by accommodating the parts to their unnatural condition, so that the sinus is converted into a hard and very insensible structure, from which it has acquired the name.

As the previous abscess has a tendency to open as well into the rectum as outwardly near the anus, so there is a difference in the kind of opening it may make. It does not open between these points, as matter will not pierce muscles if it can find any other way to advance. In the rectum the opening is usually small, but the finger can detect it by feeling a small papillary growth projected into the bowel. The other place of opening is in the integuments, just outside the anus, and external to the sphincter; and very often there is besides the opening through the integuments, also an opening at the lower margin of the anus, having nothing to do with the muscle.

To explain the necessity of the operation, I shall contrast these two cases. In that where the sphincter hardly seems interested, we find that laying open the external parts is enough, and whatever influence the constant action of the muscle may have over this wound, it still heals: it is true, this influence is not much. I apprehend that where there is a free exit of matter, and no depth of diseased structure, such is the natural endowment of incised skin, that it always is disposed to assume the function of healing over breaches of its structure, and of associating in that office surrounding parts. The division of the integuments is the best excitement to call into action these powers; but in conformity with the indolence of these parts, this influence which the skin possesses does not extend to the deeper structures.

When the fistula runs up to the upper edge of the sphincter, it is said that, in order that the part may heal, it is necessary that the muscle should be completely divided, as it is the constant action of its fibres that obstructs this process. With my views, I conceive the explanation of the effect of the division of the sphincter to be in the following way. Although some one part of the muscle is detached from its connections by the abscess, yet, as its action is towards the centre of its arrangement, it goes on to exercise its office as a sphincter, and therefore there is not that influence which the maintenance of function imparts to structure, to excite the healing process, in order that the detached part may regain its adjoining connections. But when the muscle is divided, it has lost its central direction of action, and that power which the preservation of a function exercises over parts springs up to unite the loose edges to the adjoining parts, by which means the utility of the sphincter can only be restored. Before the division, the muscle, although detached on one side, can perform its office; but after the division it cannot act towards the centre so as to close the bowel, the loose edges having no points of connection.

Surgeons must have noticed how very soon the edges of the divided fibres become connected with the surrounding parts, and the consolidation of the parts takes place, and how very soon the medium assumes all the firmness of a small tendon. Thus the muscle is restored to its original function, and the only alteration that remains is, that the muscle has a small line running through it, which is equal to a tendon.

The whole of the processes which this complaint presents to the notice of the surgeon are, in my views, conformable to those principles that are founded on the influence of the power for preserving functions which is implanted in the animal economy. It must be observed, that as soon as this process of consolidation is effected, the muscle being now in a condition to act as a sphincter, the parts are no longer urged with the same activity to go on healing; and thus these cases are often lingering when reduced to a very small sore.

I have already remarked upon the efficacy of inserting a small piece of lint, and of the proof of its utility when we find this lint thrown out from the sore. This is the evidence of the healthy powers at work in healing the wound. I believe this removal of the lint is effected by the mere action of the healing process, and not by any influence of the fibres of the muscle. If the parts become unhealthy and irritable, the lint is no longer thrown off, but remains. If the muscle reject the lint, it would do so still more actively when its fibres were most irritated. As this kind of fistula in ano is the most simple, and probably least complicated with other affections of the body, so it is by treatment effectually relieved, and the patient is left with a healthy condition of the parts.

There is an abscess terminating in a sinus, that leads up by the side of the rectum, of a perfectly different kind from the above, and which has been also designated fistula in ano. The formation of this abscess does not take place, and present in the adipose structure surrounding the rectum, but along the membranous connections of the tube itself. It usually opens without causing pain to the patient; and when explored it is found that the probe passes not into the fatty substance in the neighbourhood, but into the tissue between the sphincter and the membrane of the rectum. It occasionally passes on the outside of the sphincter, and sometimes it opens into the rectum, although but seldom. The pus discharged from it has not the character of healthy discharge. This complaint is almost always accompanied, and I believe produced, by diseased lungs. I have rarely found that the primary disease was in the liver. The probe may be passed up for a long way, and the finger in the rectum feels it with only the membrane of the bowel between it and the metal. The surgeon has only to take care that the opening is sufficient to allow the discharge to have a ready exit. Any attempt to cure this complaint by the means of an operation is fruitless, and is merely tormenting the patient, whose life is already in imminent danger. I should have said, that, in the other case, when the state of the parts is healthy, the stimulus of the fæces, when they get into the wound, by no means prevents the healing process. If the wound be irritable, they of course add much to the degree of uneasiness.

But an abscess of a more formidable character is that where not only on one side but around the rectum matter has formed, and many sinuses are produced. These are cases which have been long standing, and where the powers of health are of a low grade, and the local energy quite deficient. It seems that the state is the result of the energy of reparation having been so defective, that even the first effort for creating a boundary to the diffusion of the action, and limitation to the formation of pus, has failed. It is a condition that refers more to the means of improving the quality of health than to the advantage of an operation. I have been inclined to regard this state as a sequence of irregular function and disease of the liver.

A variety of this kind of complaint is one that in the result seems to be of the most formidable kind. It is that of the whole space around the rectum losing the quality of its original adipose structure, and becoming filled with matter; the rectum being as it were isolated, and hanging loosely in the ischio-rectal space. There is, besides matter, slough of the adipose tissue formed, and the discharge is fetid and profuse. All the cases of this kind that I have seen have terminated in death.

I have had the opportunity of inspecting one body after death by this disease. There was a vast mass of diseased tissue about the neck of the bladder, which viscus was healthy, and under the peritoneal investment the pelvis was filled with matter.

It is not unusual to have an acute abscess form at the margin of the anus; it advances very quickly, and the surface is of a black hue. It is most painful, and prevents the patient by its pressure from relieving his bowels. It is to be quickly opened; and in doing this there is a gush of very offensive matter, with coagula of blood mixed with it. The patient is at once relieved; and there is no opening into the rectum required, therefore it heals very quickly, as it would be supposed to do from the degree of activity with which it was produced; for generally, in proportion to the excitement by which the degree of inflammation is raised, is the aptitude of parts to take on the reparative functions. There seem to me to be two sources of excitement producing this sort of abscesses; the one, that of injury to the rectum by a hard substance swallowed, and puncturing the bowel, as has in some cases evidently been the case. The other the consequence of the inflammation and suppuration of a pile. From hence the coagulum is derived, which the opening allows to escape.

But I have often seen sinuses about the rectum which have been the result of matter forming from inflammation of the prostate gland. These, of course, are of a most enduring character, and offer to our endeavours slight chance of effecting a cure in considering the sinus only. They must be left to the means the surgeon may have of subduing the diseased condition of this gland. If this gets quiet, the sinus will heal, and not before; so that all injections, divisions, &c. do little. A probe, by its direction, and by its detecting the peculiar hardness of the part with which it is in contact, decides the nature of the complaint.

It is not unusual to have other sinuses about the anus that have no connection with the rectum. I have occasionally had patients who, either from falling from a height, or having been rough riders, contusing the parts about the ischium, have had disease and altered states produced either in the tuberosity of this bone, or in the fibrous structures about it, and also in the ramus of the same bone. These are intractable cases, as the powers for setting up the reparative process are very difficult to rouse. I have had a long attendance on a gentleman who suffered from most extensive and very various sinuses and abscesses within the pelvis, about the ischium, where the most probable cause was hard cavalry exercise and wet clothes. I have often had sinuses about the anus, where they seemed to arise from a diseased state either of the os coccygis itself, or of the structures connected with it. These also are secondary affections; and as they depend upon the state of these parts, so they are very intractable: they occur in structures of languid action, and are long in getting into a healthy state. If they depend upon necrosis, the release of the bone determines the case.

External piles are very generally of a periodical occurrence. I have noticed that they occur where the secretions are sparing, and therefore, perhaps, in the cold seasons rather than in the warm ones. They have apparently their periods; that is, they have a beginning, a middle, and an end. This is the case with many complaints, particularly in those for which the greatest number of remedies are proposed; the last, of course, that is used in the decline of the complaint being set down as the finest remedy in the world. If piles are exceedingly distended and painful, the best treatment is to plunge a lancet deep into them, and then squeeze out all the coagulum. This squeezing is absolutely necessary to be done; for it is the only effectual way to ensure the prevention of bleeding; as well as the subsidence of the pile. The surgeon must bear in mind, that the presence of the coagulum always encourages bleeding; and he will find the best evidence of the proof of this in the way in which he treats external piles. Females are much more assailed by this affection than men, although, owing to their delicacy of announcing their sufferings, they do not so often call upon medical men to assist them on this account. Of the many cases of gonorrhœa in this sex that come under treatment in the hospital, there are few who do not suffer much from the irritation of the matter acting upon the fold of skin which is left when the pile is really gone, and which then becomes swollen and inflamed. External piles may be freely cut off, and if the blood be carefully squeezed out, no bleeding need be feared: even if this were the case, the application hereafter to be recommended, will readily stop it. The surgeon must remember that the skin where the cut is made will swell up a good deal after the operation; but this soon subsides, and the whole disappears.

Before bringing into notice the subject of internal piles, I desire to remind the surgeon that he is to advert to the construction, and order of the actions, of the rectum. The lower part of this tube is enlarged in a capacious form, which is capable of containing a large quantity of matter, and its capacity seems to increase with age. The presence of the contents is, of course, the stimulus adapted to excite the structure to their expulsion. But the upper part of the rectum is not amenable to this influence for exciting the expulsion of the matter, nor is the sigmoid flexure of the colon; although a stimulus acting on the small intestines only, will excite the whole of the large ones to discharge their contents long before the actual exciting substance can reach the lower bowels. The influence of sympathy is probably the cause of this. We find saline purgatives soon after taken will do this, as will the increased flow of bile from the liver.

I am convinced that the sigmoid flexure of the colon and the upper part of the rectum may be distended, and yet no effort for the evacuation of the fæces, be made in the lower part. The consequence of this is, that these parts being loaded, and subject to the action of the abdominal muscles, have to sustain constant force pressing upon them, so that there is always a tendency in the membrane of the rectum to descend in folds, and become loose. This seems the first step that leads to all the annoyances of what are called internal piles. The effect arising from this loose state of the membrane is, that after the effort of getting relief of solid dejections, a fold is projected downwards within the grasp of the sphincter, which produces one of the most tormenting affections that the surgeon has to deal with. This fold, being nipped by the sphincter, gives a most distressing pain, which lasts until it gets released; and the patient often is obliged to throw himself upon a bed, and rest in torture a certain time before he is relieved by the fold being drawn up. When this is effected, he usually feels not the least of his previous sufferings. Of course the treatment is chiefly the replacing the part by means of a wax bougie, &c. In this case, the part projected downwards is often the membrane only, and not an internal pile, although occasionally this is also present. This state of derangement is generally more completely cured than that in which piles form a portion of the prolapsed part, and also leaves the bowel more completely recovered.

If there be an enlarged vein in this descending part, then, of course, the formation of internal piles will commence. These increase in size, and, the coats becoming thinner, give way, and bleed, each time they are strangled by the action of the sphincter; but they still continue as piles when the part is drawn up, and set free from the pressure of this muscle. I believe that all internal piles are the consequence of a loose state of the mucous membrane of the rectum. These piles, existing even when the membrane is replaced in its position, offer an obstacle to the passage of formed dejections, which then press the piles forward in their downward course, and thus a large mass is forced out of the anus, consisting of membrane and piles, giving that condition which surgeons have decided should be submitted to operations to give relief. It may now be observed, that these large masses of internal piles do not give great pain when down, and often none at all; so that the degree of pain is widely different from that case where only a small fold is slipped into the grasp of the sphincter. I apprehend this is explained by the relationship that exists in the functions of the parts. The stimulus for relaxing the sphincter is the distension of the bowel; and when any mass is present low in the rectum, there is a readiness in the sphincter to relax, and therefore there is none of that strong and irritable action of this muscle as there is when a small part is within its grasp. In this latter state of things there is no mass low in the rectum to excite either the muscular structure of the bowel to propel its contents, or of the sphincter to relax, which now acts most powerfully on the small fold of membrane, in keeping up a condition of constant pain and irritation until it is relieved of the presence of the fold.

This is exactly what we recognise in muscles generally. A muscle has only to be placed in an unnatural condition in respect of its sympathies and relations, when it revolts at the derangements it is under, and uses the most powerful exertions, showing the greatest impatience to be relieved from its unnatural state. It is in this way that as the internal piles increase, and the permanent mass in the rectum becomes larger, the power, or rather the energy, of the sphincter to retain its contents lessens, and that on any impulse directed to the part, particularly the effort of relieving the bowel, prolapse takes place, as the increasing loose state of the bowel, and defective power of the sphincter, necessarily promote both the facility for protruding, and for enlarging the mass.

The influence of habit will leave the bowel, when unaided by its muscular structure to propel the contents, to enlarge and form a pouch of considerable dimensions. By very gradual steps the muscular fibres will bear the residence of immense masses of indurated stuff without being excited to the effort of dejecting it; and thus the medical man is sometimes called upon to dig out, as it were, a bulk of hardened clay.

We must remember that structures whose functions are impaired have, when not impeded by agents from without, a tendency to revert to that healthy state in which their functions can best be exercised. In this case the first object would be to prevent the accumulation of fæcal matter in the sigmoid flexure and upper part of the rectum.

The descent of a fold of the membrane must place the veins that run in it most favourably for becoming hæmorrhoids; and the daily course of this condition of the membrane must encourage the increase. These piles, when the bowel is projected outwards, are full, hard, and bleed; but when the part is returned, they are felt only as small soft protuberances in the walls of the tube, which, of course, derive their distended state from prolapse of the membrane. But however small they may be, they offer an obstacle to the easy passage of the dejection, which serves to push them outwards, and to help to force the whole part down. This being a state of things of infinite annoyance, and even of injury to the health, patients are induced to submit to operations. I am aware that piles are often not merely distended veins; for I have seen them with an artery included in the tumour, that has pulsated very strongly, even as much so as the radial artery at the wrist. Surgeons have, for the most part, been deterred, on account of the bleeding that has often followed, from cutting them off. But it must be remembered, that if there be any coagulum left in the tumour after the incision, it will go on bleeding: and I believe that very generally this is the way by which the bleeding is kept up after the pile has been excised, which may have given rise to the great apprehension of hemorrhage in these operations. I have, with few exceptions, adopted the operation of excising internal piles, and with the precaution and the use of an expedient I have now to mention, I have never been troubled with any serious extent of bleeding. This remedy is simply a solution of sulphate of iron in water; a grain to an ounce seems quite strong enough. If this be injected in small quantity, so that it may be retained after the operation, I believe it will hardly ever fail of preventing bleeding. I consider the advantages of excision over tying to be, that the operation is completed at one suffering, and is almost instantaneously executed.

That the wounds being simple when the membrane is restored to its proper place, there is the better chance of the adhesive process being so far carried out as ultimately to retain the membrane in its place, and prevent the continuation of the protrusion, if straining on the parts can be prevented for three days. Indeed I have seen the prolapse quite cured by the excision. In either case the operation should be restricted to the mere pile, and not include any part of the membrane around it. I have occasionally, at the instance of patients, tied piles, but have found the pain more severe, and the swelling and soreness in the succeeding days after the operation have produced greater suffering, and the parts have seemed more readily to be protruded by the dejections than after the excision.

Of late I have found such great advantage in employing the sulphate of iron in prolapsed bowel, that the operation may very often be dispensed with, and the patient quite cured merely with the use of this remedy. Very lately I had in the hospital two cases of the worst sort,—the one of twenty years' standing, with a great protrusion and abundance of bleeding piles, who in about three weeks left without any protrusion or bleeding: declaring himself to be in a state of comfort that he had not known for so long a time. The other came from one of the institutions that offer great pretensions in the treatment of this class of cases. He was very bad, having both internal and external piles, and the bowel descending largely and most readily: he was completely relieved in about a month. Other cases of a slighter kind have been set to rights in not much more than a week. The patient should be kept in bed of course, so that there should be every facility for repose of the bowel; and after it is cleansed out, a small quantity of the injection should be daily thrown up, and retained. If the stomach can take balsams, they seem well adapted for the treatment of this disease.

It is right whilst on this subject to allude to the distended state of the veins forming the plexus about the prostate gland. When this part is diseased, these veins may be felt plainly as enlarged bodies, and they are usually harder than the mere pile: they of course are fixed, and they occasionally bleed — an event generally salutary to the disease of the gland.

Many cases occur of what are called stricture of the rectum. They may be divided into those that are annular, and into those that are tubercular. The tubercular have often condylomata around the anus: they occur chiefly in the female sex. These condylomata seem not only to spring up outwardly, but a little way up the rectum. These cases may sometimes get well after a long course of treatment. I have found in these cases the use of ærugo æris of service, and nitrate of silver. But there is a common kind, in which the rectum is studded with small tubercles some way up, as far as the finger can reach; at which point the tube is contracted. These run a very persisting course, and seem hardly amenable to any treatment. I had a case of this sort in which this disease went on involving the bladder, so that there was at length a communication between the two receptacles.

The annular stricture is also of uncertain issue. I have divided this contraction, but not with the advantage I calculated upon. Of course one great point in all strictures of this part is that of repose of the bowel, and removal of all stimulus from it in the form of fæces. The washing out of the tube is one of the chief points in the management of the case. All I can say of the dreadful disease of scirrhus of the rectum is, that I have invariably found that all contrivances for enlarging or keeping open the contracted part have been worse than useless, by aggravating the advance of the disease.

The urinary organs present too large and varied a collection of affections not to claim deep consideration, and therefore to afford subjects for observation. When the attention of the surgeon is called to the mildest affections of the urethra, he must be aware that the structure presents very striking peculiarities of endowment. We find the membrane of the urethra most delicate in its sensibility and impatient under the least rough usage; yet it suffers no irritation from the constant passage of the urine, a fluid which produces the most annoying disturbance when in contact with the surface of the body, and even death to other parts that are not shielded by cuticle. The urethra is not only a most delicate structure, but is endowed with those sympathies, in obedience to which the influences of parts act upon each other.

Thus to take a case not uncommon: a patient has a certain amount of irritation, both in the frequency and in the sensation, on passing water; and his attendant passes a bougie, and finds it stopped at the common seat of stricture: he rests a minute, and the instrument passes freely into the bladder, producing at the same time an acute fiery pain; the patient finds a certain amount of relief, and readily repeats the visit for the operation; but the surgeon finds after a few trials that the bougie meets with an obstacle about four inches down the passage: this gives the same pain as was produced in the further part on the first introduction; the spasm ceases, and the instrument passes on to the bladder without meeting with the least delay at the usual seat of stricture, and without giving pain there. This proves that there is a mutual reciprocity of excitement between these two parts of the urethra, by which the irritation of one part may alternate with another. It has often occurred that patients have come to me with retention of urine without stricture: I have passed a bougie, and on withdrawing it the water has readily flowed, and for the time the patient has been cured; but the condition of this success is, that the bougie should be passed fairly into the bladder. The temporary stricture has given way, not because the instrument has passed through the part at which it stopped, but because it has passed over, and diminished the excitability of that part near the bladder, with which the membrane at the usual seat of stricture sympathises.

In recognising the delicacy of the membrane of the urethra, and the association of its parts in their reciprocity of actions, we have data on which to found something like principles, which may explain its derangements. In reference to the first point, the delicacy of the membrane, I am convinced of this fact, from observing the results of the various methods that are often adopted in the treatment of the complaint.

If in the simple spasmodic stricture a metallic instrument be employed, it must, by its motion, in a degree force its way in the passage of it; and thus the impetus it imparts to the membrane causes it to bleed, making a wound of the urethra; which violence, I conceive, may lay the foundation of a stricture. This stricture does not follow immediately the violence, but succeeds in the course of some distant time. I have watched over patients who have had spasmodic stricture for many years, and by the gentle treatment originally adopted I have known them pass through life perfectly free from annoyance. The metallic instrument bears all down before it, and more surely gets into the bladder than the softer one. The surgeon boasts of his success, and the patient rejoices in the striking evidence of the passage of the instrument into the bladder, and, in his view of the case, this strengthens his best expectations that he will have a speedy cure. And he is perhaps told that the stream of blood that is flowing from the urethra will be only a salutary relief.

I am aware that strictures will form quite independent of violence done to the urethra. There are old and very indurated ones, of long standing, and occurring in various and uncertain parts of the urethra, which are benefited by the use of metallic bougies, and by the pressure they make upon the parts: but in the irritable stricture, I am confident that it is not cured in the best way by distention and pressure. I find, if I can once get into the bladder the finest instrument of the catgut kind, I have never been baffled in setting the tube to rights; but this confidence rests upon the fact that the bougie should pass absolutely through the whole urethra, and clearly into the bladder. This accomplished, the patient passes a slender stream. with less straining and more comfort than he did before. On the contrary, I have generally found that when I have passed an instrument only just into the stricture, and even forced it through as far as possible without injuring the membrane, but not into the bladder, that so far from the patient passing his urine better after the operation, he has had much more difficulty, and sometimes altogether a stoppage. These facts prove that the effect that bougies have on the parts is not that strictures of the ordinary kind are cured by pressure, although pressure may for a time dilate the mere contraction, but that there is an influence arising out of the sympathies of the tube which presents itself as a cause, by which a striking and permanent relief is produced in the stricture by a small bougie gently gliding through the prostatic portion of the urethra and fairly entering the bladder; whilst, on the other hand, the mere act of distending a stricture really excites an irritation in the part that adds to the mischief. Even if no other than a fine bougie be daily passed, the patient will continue to improve, although the size be not increased. It is, indeed, upon the principle of the associations of actions in certain parts of the urethra that these sort of strictures are cured. Moreover, I have observed, that when it has seemed proper to increase the size of the bougie, that on the first use of this larger one, the patient has not felt so well as before; but again feels his improvement go on as long as the same size is continued. By these gentle means I have no doubt, from what I have seen, that this class of strictures is best, most safely, and most permanently cured; that irritation, which has called into action associated derangements, being thus removed.

But the influence goes beyond the first stricture I have now spoken of; for if this has existed some time, and advanced so far as to have formed a perfect contraction, there is then another formed in a part anterior to the other, as is well known to surgeons; and if a bougie larger than that which would be used for the posterior stricture be taken, the tube is found obstructed at about four inches down. Now as this is the sequence of the other stricture, and as both are formed in unvarying places in the urethra, and both relieved by passing the bougie to the utmost extremity of the tube, they both must arise from some peculiar state arising out of the endowment implanted in the part near the bladder, independent of contingent circumstances, and acting under settled associations; and therefore, I conceive, it is not correct pathology to say that strictures are the result of casual inflammation indifferently attacking some part of the urethra. This view is strengthened by the fact that the beneficial influence of the bougie is produced on the first stricture, whilst it, by the size, might only be regarded as acting on the posterior, being too small to be calculated in any way to distend the first stricture; while the posterior, on the other hand, will sometimes be benefited by only acting on the anterior one.

In proof of the advantages of mild treatment in strictures, I shall produce this one case. A military gentleman, who had been stationed some years in the Mediterranean, got leave to come to England for relief, as he could get none abroad. He suffered all the misery attending bad strictures, squeezing out a small quantity of urine, with torment, &c. He sought the aid of a surgeon, who adopted the practice of forcing a metallic instrument through the stricture, by which he lost deluges of blood, and found besides the treatment made no advance in relieving him. He then placed himself under my management. I employed a very fine catgut, but had to make several attempts before I could pass it into the bladder. After I had once accomplished this he felt considerable relief; and afterwards his improvement was rapid: he was quite restored in all the powers and functions of the tube in a comparatively short time. I am ready to believe that there are no strictures of that kind, which have their origin in mere irritation, that are not perfectly curable by this line of treatment.

Another order of stricture is that in which the urethra is beset with hard projecting bodies throughout its spongy portion, arising from an altered state of the lacunæ, which are changed into an almost cartilaginous structure. These are numerous; and as each fills nearly the calibre of the tube, they offer a great obstacle to the introduction of an instrument; and this they do in a way that should be borne in mind. The space in the first stricture, through which it may be possible to pass an instrument, does not necessarily correspond in direction with the opening of the second, consequently the instrument by passing through one is not led to the opening of the second, but is then carried against the projecting part, which offers a direct obstacle. Thus a firm instrument is less likely to arrive at the successive openings owing to the deviations which the first bodies cause; and a soft instrument has hardly power enough to encounter the resistance of these indurated projections. But even here the catgut and perseverance will restore the parts. As the excitability of the prostatic portion is but little in this sort of urethra, the principle of dilation may have a place in the treatment. I have regarded this state to have been the consequence of the free use of injections.

There is another variety of disease of the urethra, which conveys to the feeling when an instrument is passed of a small spongy substance, which bleeds on the slightest touch. This is generally obedient to treatment, and is relieved when a wax bougie can be got into the bladder.

In the observations I am about to make on those important cases which are the consequences of strictures of the urethra in adjacent parts, I must advert to one point, that this canal being one part of a system adapted for collecting and expelling the urine, the whole economy of this system must have a mutual participation in their several functions; and as these functions are associated, their order and arrangement may be altogether changed by any infraction that occurs in one. The conservative influence by which the system is protected excites those actions which, under the varying state of the parts, are best calculated to maintain the economy of the whole.

If a surgeon deems it advisable to keep in the bladder a catheter, that the urine may flow through it, he, in a very few days, finds that the urine not only passes through the instrument, but also by the side of it, so that the urethra does not forego its functions. In spite of the instrument it assumes its proper part in the series of operations for conducting the process of emptying the bladder. In the operation of lithotomy a large opening is made into the urethra, in order to extract the stone, and generally the urethra is much contused. The surgeon leaves the parts alone, and the wound heals kindly, often quickly ; and the water escaping from it does not prevent this taking place; but further, it ceases to escape before the wound is quite healed. The power of conservancy of function is dominant here, and the fluid will pass through the urethra entirely, notwithstanding there is an opening through which it might escape. If he were to keep an instrument in the urethra, he would do worse than an useless thing; he would weaken those powers which result from the natural efforts of conservancy. When a stone in the bladder has been removed, it is quite possible that as this organ is relieved from the irritation of it, all the powers of restoration are elevated to an increased degree of energy. A stone is impacted in the urethra, it is cut upon, and an incision fully equal for its removal is made; afterwards surgical aid is little wanting, for the wound heals without trouble. I had a patient in the hospital whose glans penis had by deep ulcers been reduced to shreds; these shreds were ulcerated particularly at the base, and it seemed that the passage of the urine over them kept them from healing; seeing this, I made an opening through the spongy structure into the urethra just between the scrotum and the bulb: this fully accomplished the purpose I had in view; the ulceration of the ragged glans healed now it was not exposed to the irritation of the urine. But I had really difficulty in keeping the opening into the urethra from closing; and this took place rapidly when left uninterrupted. I have seen a stone about the size of a kernel of a nut lodged in the membranous portion of the urethra; and very soon after it arrived in this place the tube dilated so as to form a pouch for its lodgment, and this portion of the urethra resumed its usual calibre, so as to admit a full-sized catheter, although the stone remained.

I have stated these things to show the strong conservative powers that exist in these parts to preserve the due ministration of functions.

We must recollect that there must be a relation between the muscular coat of the bladder and the state of the urethra, and that a variety in the calibre of the urethra will cause a change in the state of the muscles of the bladder. The association of functions moreover produces what most surgeons must have met with, that, cæteris paribus, an instrument passes easier at the time of a full bladder than when very little water is present. I once was unable to get a catheter into the bladder of a person who had suppression of urine, and there was no state of the parts discovered after death that could account for the difficulty. There was no water in the bladder.

We have an accurate arrangement in the urinary organs, and we have also an ample provision by the endowment of adaptations, for the security of the regular exercise of the functions. And some slight infraction of the order of the associated actions is likely to give rise to great derangements. Supposing that the tube through which a fluid is to be forced be divided into two parts of different calibre: in order that the force should only be expended on the fluid, it will be necessary that the velocity of the fluid in the narrow part should move in the proportion to that of the larger as the square of the diameter of the greater to the square of the diameter of the lesser; and so much of the momentum impressed upon the fluid which is not expended upon this increased velocity, is lost upon the sides of the wider part of the tube. Thus in strictures there is always a considerable force lost upon the side of the posterior part of the urethra, because so far from the urine passing through the stricture with increased velocity, it is with great straining squeezed out very slowly. It is likely, then, that some changes should take place in the urethra posterior to the stricture.

We must advert to the influence that this obstruction to the free passage of the urine may have upon the bladder; and I believe it will be found that there are two results, probably depending upon the difference in the irritability of the bladder, that may ensue. The one is that in which the muscular structure is greatly increased, and the cavity much diminished. The other is where the capacity of the viscus is increased, and the muscular coat but slightly thickened. In the former state we may also probably look to the irritable state of the prostatic part of the urethra as a further cause.

In the consideration of this disease there is an element to be taken into the account which, I think, is not ordinarily brought under view. I am convinced, from a long attention to the course of gonorrhea and other circumstances, that the prostate gland is a very common source of the derangements in the urethra; and that under an altered state of this gland, the associations between the bladder and the urethra may be deranged; by which strictures, fistulæ, or abscesses may be produced. The power of accommodation which we everywhere recognise, and which is fully displayed in the urinary organs, is the reason that the advance of stricture is to the patient insidious. He is little aware of the increase of the voluntary force he employs to expel the urine, and is unobservant of any change the stream may assume; and often mischief of a serious kind presents itself before he is aware that any imperfection exists in this part of the system.

I must observe that it is not every case of effusion of urine that is accompanied by a considerable stricture; and this is an additional reason for my placing so much to the account of the prostate gland. The inflammation of this body often occurs as a temporary affection at all ages, during which state of it, abscesses readily form in the neighbouring parts. Before giving my views upon the treatment of these cases, I shall relate a case to exemplify the principles which I consider should be observed. Many years ago a young gentleman put himself under my care for a gonorrhea; it was severe, and an abscess formed in the perineum; I opened it early, and it quickly healed, without any drops of urine passing through it, so that I felt assured there was no fistula. He got quite well of the gonorrhea and of the thickening of the abscess. In about a twelvemonth he came to me again with a gonorrhea. Abscess formed again; but this time there was a communication with the urethra; the water passed out through the abscess. The gonorrhea subsided, but the fistula did not heal, and he became anxious, and consulted another surgeon, who advised him to lay up, and keep a catheter in the urethra, so that the water might flow through it, and that the wound might heal up over it. As this was in my view wrong, I advised him not to do so. This advice puzzled him, and he naturally consulted many other surgeons, who all advised the same plan as the first had done, and which I as firmly dissuaded him from following. He abided by my opinion, which was simply to lie quiet, soothe the parts, and he soon got well. I was assured in my own mind that the mere passing of a few drops of water would not prevent the place healing, if the parts where the abscess was, were allowed to get into a quiet state; and that the catheter would by its presence add to the irritation, and prevent the parts subsiding into the state best fitted for the process of reparation. This gentleman had gonorrhea a third time, and the formation of an abscess again took place; but both got well by his pursuing the same negative treatment. I know that he has remained ever since quite well. The truth is, that it is not by any mere mechanical adaptations, but by adopting those measures which can best ensure the train of actions which is to promote the processes of reparation, and also can place the parts in the best condition for exercising their functions.

When a stricture is so far advanced that the aperture through it is but small, the impulse of the urine in its discharge is continually acting upon the stricture itself, as an excitement which adds to the irritation of it, and therefore really promotes its increase. The force of the fluid also is continually exercising an unnatural pressure upon the walls of the tube behind the stricture. From the knowledge we have of the force this impelling power can produce, we might suspect that the effects it can occasion would be both greater and more common than we find is the case. The injuries resulting from it are of two kinds: it causes the tube to give way in the form of a very small ulcer, and probably the aperture is so minute that it only allows one drop of urine to escape at the time the fluid is flowing through the membranous portion of the canal. This small quantity passing into the adjoining structure is of such an irritating quality that it excites the parts to deposit lymph, and thus a wall is formed about the tube, and the structures are preserved from the destructive influence of a complete effusion, the continued irritation of the contained fluid brings on the suppurative process, and a small abscess is formed, which, although it only presents itself as a hard tumour in the perineum, must be viewed as more than a mere induration of the part, for it is indeed the first stage of a fistula in perineo. The patient finds that he has more than usual difficulty in passing his urine, but that he has not so much pain at the time he is relieving himself, as a few minutes after he has finished. Each time of micturition a drop of urine escapes through the aperture in the membrane, which produces this pain until it is well diluted with the pus. In this way the tumour increases and assumes the unequivocal character of an abscess. As this becomes larger and the quantity of pus greater, the effused urine produces less pain. The wall formed by the deposited lymph, as well as the barrier of the fascia, prevent a rapid increase, and convey the feeling to the touch of hardness, so that it is long before anything like fluctuation is felt; and therefore, without waiting, the proper practice is promptly to plunge a scalpel into the tumour, and freely open a way not only to discharge all the fluid, but to prevent the possibility of its accumulating. The surgeon will have to contend with the arguments of the patient to get his permission to adopt this operation, as the latter regards it only as some trifling matter; but the surgeon foresees the great mischief of delay.

In the very beginning of the case the thickening around the urethra is such that its pressure inwards causes an obstacle to the passage of an instrument, and the adopting of such a measure has an injurious tendency, as it only adds to the irritation already commenced, and besides cannot have any effect in diminishing the obstruction. The best prospect for the healing of the parts depends upon opening the tumour at the earliest period, because in proportion as the thickening is less, so is the readiness to heal the greater. And when this abscess is opened, and the matter and urine, if any, have a free exit, the whole treatment should be that of soothing the structures. Of course the urethra should not be teazed with the passing of instruments for some time: the surgeon will have the satisfaction of seeing that many of the symptoms will subside, and even the fistula heal soon, if there is but little thickened structure about the part. I repeat again, that to avoid a long train of annoyances, it is most important that the operation be done early, and however hard the tumour is, still it should be done. Even in this early state, when opened, there will be found a little cavity not larger than to allow the end of the finger to enter, of that smooth pulpy kind which the surgeon is well acquainted with as an abscess in its very early form. For the first day or so, although there is a communication with the urethra, the urine does not appear to pass through the wound; but as the poultice softens the parts and reduces the swelling, the water then comes out in drops on micturition, which clearly decides the fact of the communication with the urethra.

If at this time the surgeon proposes the keeping hollow instruments in the urethra, to prevent the urine from escaping, he will adopt a wrong measure. I have fully detailed the case where I opened the urethra on account of the glans penis being ulcerated into shreds, and also those for the extraction of stones from the urethra by incision, and stated the readiness with which the wounds healed, and therefore I infer that it is not the mere passing out of a few drops of water that prevents the wound from healing. The urine is the appointed stimulus to the urethra for its expulsion, and the execution of that act implies the full exercise of the function for conducting it out of the very orifice. If the principle of hydraulics were allowed to have their full agency, the water would be scattered through all wounds in the urethra in a way very different from what we observe to be the case.

In insisting upon the propriety of laying this tumour or small collection of matter open as soon as possible, it must be evident that a great advantage will result by having thereby a less extent of altered structure to deal with, and consequently a more favourable state for the ultimate healing. But what is very important, we prevent the interruption of the natural economy of the part, and preserve the powerful influence which the conservancy of function exercises over structures. Thus if, with the exception of a few drops, the urine is conducted in the usual way through the urethra, there is a strong disposition in the parts to repair this little defect, and to sustain in perfection the integrity of the function. On the contrary, if the tumour be allowed to increase, and the opening in the tube to enlarge, together with a greater extent and degree of induration throughout, when the opening afterwards is made, a large quantity of fluid passes through, and probably with little uneasiness, offering a new channel which really supersedes the office of the urethra, and diminishes those energies that arise out of that influence which the preservation of function has established. Upon these principles it is that I object to the keeping an instrument in the urethra in case of fistulæ, inasmuch as it interferes with the appointed economy of the part.

and supersedes the appropriate function, the influence of which is a dominant power for restoring the mischief.

I must repeat what I have so often enjoined, that the practice should consist in soothing the parts and keeping them in as natural a state as possible by avoiding any unnecessary interference. The patient should be kept in bed, and his state of health of course strictly attended to. This form of abscess or fistula is usually met with in robust patients, or those who are not advanced in life.

I have occasionally seen a small collection of pus in the tissue under the skin of the perineum, and seeming almost pendulous: this has occurred in those who have had an irritable urethra; the abscess, nevertheless, having no connection with it. I have, however, seen this formation occur more than once, and get well, when afterwards an abscess communicating with this canal took place. I think they arise from some associations of sympathy in the urinary organs. Sometimes this small collection has been absorbed; and when opened it has soon healed.

The other case of the escape of urine, or rather the case of actual effusion of the fluid, is of a much more formidable character. The subjects in whom it occurs are usually of a different class; being generally advanced in age, or, at all events, with the general health impaired by previous disease. The causes leading to this complaint are, as in the other, a long-existing stricture, and the unceasing pressure upon the tube beyond it. This pressure acting upon an attenuated membrane, which is participating in the general weakness, does not cause it gradually to yield and give way only in a small point, but suddenly by a rent of some size; and the urine, unrestrained by that barrier which the thickening has formed around the place, is propelled into the cellular structure about the membranous part of the urethra, and thence possibly in every direction that the neighbouring fascia will allow it to take. Of course it is restrained from going backwards, but it may pass forwards in all directions to the scrotum, penis, groins, and abdomen: I have even seen it urged almost to the arm-pits. It is thus a very grave case, both from the character of the health of the individual, and from the wide extent to which the urine may carry its deadly influence. This destructive fluid is propelled more largely, and more widely, on every effort the patient makes to empty his bladder. It is necessary to make a large opening into the perineum, not only to discharge the effused fluid, but to secure the most open and the shortest passage of the water from the bladder on micturition.

It has been supposed that it would be necessary to make an opening also into the urethra, but Mr. Abernethy has long ago explained the uselessness of such a proceeding. The opening into the tube is already made by the rent, and is equal to all the occasions for it. The effusion of the urine has really dissected the urethra, and often the issue of the water through the aperture may be seen to be freely going on. This is the great point of practice, to insure the free discharge by the shortest course in the perineum. Other openings may be necessary to give vent either to matter or to dead cellular tissue. If the effusion has existed a few days before the opening is made, there is also an accumulation of matter mixed with the urine. As in the former case it was unwise to irritate the urethra by instruments, it must be more so in the present state of things, where there is much more weakness of parts, and more general want of power.

The further treatment will consist in restoring the best state of health to the patient, and of tranquillizing the parts. Besides the employing measures for improving an impaired constitution, there are additional means demanded for increasing the vital powers, in order to set free the various sloughs which the irritation of the urine may have produced, and to sustain the suppurative process. There is in this case no reason for interfering with the stricture, because the free opening made in the membranous part of the urethra prevents the impetus of the current which arises from the differential force of the fluid in its narrower stream through the stricture, from affecting the tube, the whole force being expended on the fluid that escapes. I have known in these cases that the stricture sometimes gets well without the adoption of the usual means for its cure. It is no unusual thing for a patient to find that after a week or two the water passes more easily and more fully through the orifice of the urethra than it had done a very long time before the effusion, although no bougie has been used.

If the powers of the patient can bear up and sustain the processes of nature, the wound may heal. As the integuments are disposed to heal long before the urethra is closed, there is much attention and ingenuity required in carrying on the treatment, for the urine is, by the narrowing of the external artificial opening, pressed into the adjoining parts, where it burrows. The bougie is now required to improve the stricture, and so to diminish the quantity that may be forced out of the tube, and thus to avoid those fluctuations which attach themselves to this case. The keeping instruments in the bladder is more injurious here than in the other descriptions of cases. As there is a state of things that offers less power for contending with those obstacles that are calculated to impede the restoration of functions in the urethra. Of course the elements to form a prognosis are to be found in the age and debility of constitution of the patient. These cases will often do well.

There is by no means an unusual accident, occurring from the patient having fallen on a hard substance in a stradling position, by which he receives a hard blow between his legs, so that the urethra is crushed between the hard body and the pubis; this often happens to boys walking on a rail, by which the urethra is ruptured. This is followed immediately by a considerable effusion of blood, great pain, and impediment to the passage of the urine. It is often useless, and indeed injurious, to try to pass a catheter in such a state. The catheter generally cannot be got into the bladder, and it may do positive harm by getting entangled in the ruptured part of the tube. The pain is very intense, because the blood effused is bound down by the fascia, and pressing on the urethra must of itself be a cause for impeding the passage of urine. The proper step is at once to lay open the tumour by a long incision, to get out the clotted blood, and thus leave a free exit for the flow of the urine, which will follow, and give present relief, and then wait the events. The subsequent treatment will be that of following the principles already laid down. I regret to add that these cases often lead to permanent imperfections: the rent does not heal, perhaps, because there is some loss of the structure, and the stricture which is formed does not yield to ordinary treatment.

In adverting to the diseases of the prostate gland I have remarked that I am impressed with the opinion that this organ is very much more commonly the subject of derangement than surgeons are willing to impute to it. I believe that there are few cases of gonorrhea in which the prostate is not affected and inflamed in a slight degree. I have already stated that I think many of the abscesses leaving fistulæ in perineo have their origin from derangement of the prostate gland. There is a pain occurring in gonorrhea which the patient feels near the bladder, more particularly when he stands, which I am disposed to refer to a slightly inflamed state of this body. But this sort of affection subsides, and the patient perhaps is never troubled afterwards with the like complaint. I have seen patients through life who have had this attack in youth, but have not suffered from it when old. Like the uterus, the prostate gland seems to form extensive sympathies, and thus in these slight affections it produces pains in various directions.

The sympathies of the urethra with this gland are well known, and there is almost always a slight stricture when it is in any way deranged. This body seems to go on imperceptibly altering in size as life advances. The patient is not aware of the change that is going on, and the only difference he finds is, the more frequent demands he has to pass his water, this being the effect of the enlargement, by which it happens that he never completely gets rid of the whole quantity, and thus a residuum is constantly left. The patient is now very liable to the accession of fits of irritation or inflammation, which usually occur in the autumn or winter, and seem to be brought on by cold; and the result of which is retention of urine. Besides the well-known symptoms he has considerable tenderness when deeply pressed over the pubis in the direction of the neck of the bladder. These attacks affect the system considerably: by which the tongue is coated with brown fur, and the patient loses his appetite. As this constitutional state is the result of the local irritation, the line of treatment seems to be pointed out, which is to soothe the parts as much as possible. The bladder should, of course, be kept as empty as possible, but by means the least irritating, and by passing the instrument when it is wanted, and not by keeping it constantly in the bladder, which, in the tender state of the gland, must be a source of great irritation. In reverting to the progress of this affection, it may be probably explained by the fact that the power of the bladder for evacuating the whole of the urine soon becomes weakened as the prostate gland is enlarging ; so that after micturition, there is a certain quantity of urine still left, which abides there without exacting the muscular fibres of the part to contract upon it. It is also probable that at all ages there is a point of distention to which the bladder must be subject before the organ is excited to detrude the fluid. If we suppose that the point at which the quantity of fluid excites the bladder to act, remains the same, and the residuum goes on increasing, then the difference between the residuum and the exciting quantity must go on lessening. Thus if the bladder has generally been impatient when distended by eight ounces of fluid, and it has a residuum left of six ounces, then it becomes uneasy when only two ounces are added to that which is left; this will account for the frequent desire of making water as life advances. And if this residuum is further increased, and the difference so lessened, that the constant contents coincide with that quantity which has been the habitual excitement to the bladder to relieve itself, then another order of things takes place. Every drop that now falls into the cavity is at the same time producing a stimulus on the viscus, that excites the action for expelling it, and the case becomes that of incontinence of urine.

Except in children, all the cases of incontinence of urine that I have seen have occurred in persons who have enlarged prostate, and arising, as I conceive, in the way explained. They have really been the effect of overflowing of the fluid, when the indifference to the presence of the urine has reached that degree of distension at which the accustomed quantity has been equal to excite the muscles to expel the fluid. I except cases of paralysis.

The treatment of this case of course includes the use of the catheter, as well as in that of retention. In the latter case, by the regular employment of the catheter, we find that the muscular structure of the bladder will gradually recover its susceptibility to the stimulus of the urine. We find that very soon small quantities of urine begin to be voluntarily expelled, and as the quantity thus evacuated is increased, so the residuum to be drawn off by the instrument lessens. At last if the patient be desired to expel the urine before the catheter is introduced, there will be only a few drops left for that conveyance out. The incontinence of urine offers the same expectation of success from this treatment.

When the prostate is enlarged, and it becomes inflamed, it usually lasts a certain period before it gets into a quiet state, and as this fit of irritation subsides the patient begins to pass his urine, gradually increasing the quantity that he expels. The treatment in these attacks is chiefly to keep the patient warm in bed, directing medicines to keep the skin moist, and to ensure the evacuation of the lower bowels. If the case is severe, leeches should be applied to the gland through the rectum. The leeches relieve the inflammatory action, but, as is the case when they are applied to the uterus, they are apt to excite a good deal of irritable feeling. If the prostate is much indurated we can always feel the enlarged plexus of veins about it, and if they bleed this loss of blood produces a salutary relief. The soothing influence of opium in the rectum is always to be borne in mind. I have seen the practice followed of keeping a catheter constantly in the bladder for the enlargement of this gland, but with the worst effects : it seemed to keep up the state of inflammation, and the patients suffered in their health, with the tongue more than usually furred, the appetite quite lost, night sweats, and quick pulse, and the urine loaded with mucus. This practice produces much more irritation than the introduction of the instrument twice or thrice a day.

The series of derangements of the bladder seem to indicate that it is a structure slow to shake off a disease ; indeed it is in the unfortunate condition of not being allowed to subside into a state of quietude on account of the occasion for its constant action. Yet I have known several persons with these complaints, whom I have watched for many years, pass on tolerably comfortably to a very advanced age. I do not forget that there are many evils attending the transmission of this irritation of the bladder to the kidneys.

I have seen cases where suppuration of the interior of the prostate gland has taken place. These, as may be supposed, have been accompanied with sinuses in the perineum in all directions, and communications with the rectum, and have all been cases of extreme suffering, and of most depressing influence upon the system. They have all soon gone on to destroy life.

When the prostate gland by its enlargement has advanced into the bladder, the surgeon has often difficulty in getting his catheter to pass it, and even if this is accomplished, there may be so little freedom of moving it that he cannot make it range over the whole cavity. And although the urine may flow freely at first, it suddenly stops, and a considerable quantity remains undischarged. The use of the instrument is very liable to cause bleeding into the cavity. These cases are sometimes represented as those of spontaneous bleedings into the bladder. The enlarged prostrate of course has the effect of constantly exciting the part to expel what little urine may collect. I have seen two cases of enlarged prostate divided in the operations for lithotomy, and the glands gave no sign of suffering from the wound; indeed when the wounds were healed, the size of the body seemed to have been lessened.

The elastic catheter has been much extolled, and even now it has its privileges; but it has not the advantages of the silver instrument; for this is also a probe, and transmits to the fingers all the tangible circumstances that may occur in the passage of it. Thus we know best by this the situation and the degree of induration of a stricture, the hardness of the prostate gland, and all the peculiarities that may exist in the entrance of it into the bladder. Therefore at first examinations we are made more familiar with the circumstances of the obstructions when we use the metal instrument. The elastic tube, when it has a stiff wire, is inferior by far to the other, for it does not transmit fully the sensations given by the parts to the fingers, and yet it has a degree of rigidity that may readily do mischief without using it with great caution. When, in the case of enlarged prostate, the manipulator is familiar with the course of the passage, then the elastic tube, which retains its curvature without the wire, is an admirable instrument, as it may be employed with great ease to the patient. In disease of the prostate, an instrument of as large a diameter as the urethra will admit is best adapted to the case. It is laid down that for this purpose a longer length of instrument is required. This is so far true, because the gland lies higher in the pelvis, as the lateral ligaments of the bladder implicating its structure prevent its descent; and therefore when it is enlarged it must carry the bladder upwards with it. In irregular stricture the elastic catheter is often best suited for passing, as the evenness of the canal being broken in upon, the flexibility of its structure allows it to be insinuated in spite of the obstacles; but the greatest delicacy must be observed in the use of it. In very straightened strictures, the soft wax bougies do not offer sufficient firmness, and then the catgut presents a very convenient substitute. I fully believe that a stricture can be cured if a fine catgut can be once got into the bladder.

Much has been said about the curve best suited for an instrument to glide easily into the bladder, and each surgeon gets partial to one form. It implies ignorance of geometry to suppose that the curve of the instrument should be the same as that of the passage. The natural line of the urethra is an irregular curve. Now, except the straight line, it is only circles of the same diameter that can be adapted to move regularly in the same curve. The curve of the urethra is not a circle, but made up of various curves. The dimensions of the pelvis differ in men as well as in women, particularly from pubis to sacrum; and this circumstance should vary the curve of the instrument. I think the best form is a large segment of a circle of a large diameter; but a surgeon should accustom himself to any form of the instrument, and to any position of the patient in passing it. The method of using it is of more consequence than the curve; and as the figure of the urethra is of an irregular curve, the great point is to turn it over the shortest turns with as much adaptation of the instrument to the curve as possible. It will be easily conceived that the operator can transfer his guidance either to the point of the instrument or to some part nearer the handle; if he presses the point, he will be in the way of pressing this part through the structure without much care. But if he directs the force which is to move the catheter to another spot on the instrument, then it will pass smoothly on parallel with the sides and in the course of the canal, and he will be least likely to do harm.

It has been a wrong instruction to direct that when the instrument is passed with the convexity to the abdomen, as it gets under the arch of the pubis, it should be turned, making then the point fixed as a pivot, so as to bring by this one movement the concavity to the abdomen. This will probably make a fold in the membrane, and impede its easy course. Any turn that may be required should not stop its onward progress, as it will then glide forward without ruffling the urethra. The operator may commence the introduction of the instrument as he pleases, but it should be kept gently moving on, and when the point gets to the arch of the pubis the handle should at the same time be kept close to the groin, and as the point moves forwards the handle should be brought round in front of the abdomen, and then brought forward, by which movement the point will readily take the upward direction that leads into the bladder. But in all difficulties, although slight, the finger should be passed into the rectum to guide the instrument. The surgeon should always bear in mind that in young children the bladder lies very high in the pelvis, and that there is a long track of the membranous part of the urethra where the textures are very thin, and the pelvis being very narrow, in any state of the parts, the instrument may readily pass into the rectum. This I have seen very often done by those who do not attend to the points I have laid down. Therefore in young subjects the operator ought always to pass his finger into the rectum to guide the instrument through the sharp turn, which the narrow pelvis causes, when it has arrived under the pubis. Now this happens commonly without the surgeon being aware of it, because it is really an accident followed by no inconvenience; the puncture into the rectum closes very quickly. This is another instance of the influence of the power of conservancy for preserving functions.

We find in children a readiness for calculi to pass into the urethra from the bladder, and to change their situation from time to time, as we often find in the bladder a large calicaulus with a projecting part that has laid in the urethra. In this age also there are often found calculi of some size fairly advanced in the urethra: I have removed by incision several, and although in one case the stone was as large as a full-sized filbert, and of course required rather a large cut, yet the part, in conformity with the power of conservancy, most readily healed. The removal of them by incision is far preferable to the teazing, and often ineffectual attempts, of withdrawing them by means of the forceps. When the calculi lodge in the urethra of children there is generally a free channel left open by their sides, for the passage of the urine. I shall add that in sounding children with stone in the bladder, I have very commonly found that I have pushed back the stone which has been wholly or in part lodged in the urethra. We find that children suffer very differently who have calculi impacted in the urethra. Its mechanical form will cause this variety; if it is sharp-pointed, it gives great pain and excites irritation beyond the stimulus of relief; it disturbs the part and diminishes the chance of its removal; but if it be smooth it only excites so much action as to call upon the powers of relief, and this will gradually advance it in a way to be expelled.

If there be no difficulty in passing the water, and the pain be little, the best course to adopt is, I think, to leave it to the probable efforts of the part to expel it, unless it remains a long time persistent in one part, and then to remove it by an incision. When calculi, particularly the small ones, remain deposited in the urethra, by the irritation they produce, they dispose the membrane to contract and form a stricture anterior to the part in which they are lodged.

I have observed that in those cases of malformation, in which there is an imperfection in the urethra by its terminating short of the proper point in the glans penis, that the part is extremely irritable, and liable to discharges not infectious, and also to the formation of strictures. If gonorrhea occurs in such a state of things, it is very tardy in disappearing.

The cases of stricture with complete obstruction seem to have been far more common formerly than now, and there were at one time many more cases that required an operation for relief. The practice then pursued was to puncture the bladder above the pubis, if the catheter could not be passed. It appeared to be a very successful practice; and I have done it often, and very rarely lost a patient by it. Where the patient was not very old, and tolerably healthy, it has never failed of restoring him to health. I have never seen any infiltration of urine follow this operation that was of consequence enough to retard the cure; and the wound has readily healed, because the urine soon found a passage through the urethra. The advantage of this step has been that as the urethra is not for a time called upon to sustain the force of the propelled fluid, and has been kept in a state of quietude, it readily has returned to a state fit for carrying on its function. It is left to the power of conservancy when it has been freed from the irritation of the undue mechanical forces of straining, which have been the cause of the daily increase in the obstruction. And this is in my view a very powerful reason for adopting this operation over that one of opening into the urethra at the membranous portion. The latter operation presents itself with more imposing anatomical circumstances; but it has been followed under my observation with very inferior success. I have seen several patients die after this has been performed from the effusion of the urine within the pelvis. This last operation is more difficult than by the description it is made to appear, and therefore it is long and exhausting to the patient; whereas the opening above the pubis is effected most quickly and with great facility, so that the patient is at once relieved and may be speedily placed comfortably in bed. But above all, he has got rid of all that continued irritation in the urethra which the state of the stricture produced, and is placed in a situation to sustain with strength the subsequent processes for his restoration. Many years ago I was called to an old coachman of a physician, who for twenty years had suffered from a bad stricture: this at length became so serious that he could pass no urine, and I could pass no instrument. His bladder was vastly distended and very tense. I introduced a trocar at once into the bladder above the pubis, and having an elastic catheter at hand, as I withdrew the stilet I introduced this tube through the canula. He was immediately relieved of all his distress, and had no bad symptom. He was surprised to find that in a fortnight the urine passed through the urethra better than it had done for twenty years, although the tube was still in the bladder, and in about three weeks the stricture seemed quite removed; in a month the artificial opening closed, and he was quite a new man. I may adduce this case as an instance of the powers which the conservancy of functions exercise in the restoration of impaired structures, when the parts are left in a state of quietude. The urethra was in this case left undisturbed by the passage of urine, and in a condition to resume its healthy state.

The way which is usually described as necessary to be adopted for making an opening into the urethra appears to me to lead to a difficulty. It is said that a staff is to be passed down to the stricture, an opening is to be made behind it, and then the stricture is to be laid open. This is described as a proceeding much more easy than is practically the case. The staff is calculated to impede rather than to assist in the course of such an incision ; the instrument cannot be got to that part where it is wanted, and the slightest deviation laterally must direct the incision on the one or other side of the urethra. In short, it does nothing in pointing out to the operator the line of his incision, and thus the attempts to find the stricture, only lead to many unnecessary divisions of parts in the neighbourhood, by which more opportunity is given for the urine to burrow ; and with every care, and perfect acquaintance with the anatomy of the parts, the knife opens further into the pelvis than is required, by which effusions may take place about the bladder, and perhaps the patient may sink from this cause. I am of course now speaking of those cases where no fistulous opening exists, for if so, a probe passed through this sinus will be a guide for enlarging the apertures.

The mode of opening into the membranous part of the urethra for the purpose of relieving retention of urine is precisely that, which is the chief step to be adopted in the operation of lithotomy. The operator, by passing his finger round the arch and rami of the pubes, can gain a sufficiently accurate knowledge of that circle of which the point where the urethra passes through the triangular ligament is the centre. To this point he directs his knife, and with care will then open into it with the least possible disturbance, or unnecessary divisions of the neighbouring parts. But this operation, even when happily accomplished, has neither the facility nor the subsequent advantages of the one above the pubes.

The cases of fistula lachrymalis that have come under my notice might be divided into two classes. The one depends upon disease of the superior maxillary bone, which arises for the most part in consequence of venereal infections, so that when the specific disease is removed, this form is cured without any further treatment. The other division is that which depends upon an altered condition of the mucous membrane of the nose, by which the nasal ducts, being a continuation of the same membrane, become thickened and blocked up. This membrane varies much in being more or less loose in its connection, and also in the turgid state it may assume, so that it may readily be in a condition to close the nasal duct without there being actual disease in the canal, and thus prevent the passage of the tears downwards. In this way there is an undue pressure on the sac, and thus the first step is established of a series of future stages forming fistula lachrymalis, if not averted. I knew a young lady who was subject to an impetiginous eruption about her lips on one side; this would leave her, and then the mucous membrane of the nostril on that side would become vascular, turgid, and dry, and the sac would become distended, so that she had the tears flowing down the cheek, a condition which might lead to the formation of fistula lachrymalis. This state was soon relieved by soothing means, &c., but the alternation occurred a few times. In all the cases of this description I have found the membrane turgid and the nostril dry for want of mucus; an altered state of the membrane exists, and therefore the lining of the nasal duct participates in it, and is closed. I have relieved this complaint very often on soothing the membrane by inhaling steam into the nose, the application of leeches, if apparently required, and by exciting the secretions from the mucous membrane. If any operation be required, we have a mode of opening the passage by passing a probe into the nasal duct from the nostril, which the slightly expanded opening of it in the nostril allows without difficulty; and I have adopted this mode with great relief.

Strictures of the œsophagus have been described as like those of the urethra. Those that I have seen have been of two sorts; the one, scirrhus of some part of the tube, for which the affectation of treatment may do more harm than good; the other, occurring in females, has been so generally co-existing with hysterical symptoms, that I refer them to that course of treatment. The use of bougies offer an amusement to the patient and perhaps the surgeon, and not much more, in point of benefit.

In those slight injuries which are commonly called sprains, there has appeared to me to be a difference between injury done to a tendon and that to a ligament. The injury occasioned by a trip in running down stairs either affects the external ligaments of the ankle joint or of the tendons of the peronei muscles, the brevis usually. In the case of the ligaments being injured there is usually no effusion of blood, and a considerable time is required for getting rid of the pain on moving, particularly if the parts are put on the stretch by using the limb too early: but when a tendon is sprained, there is generally a little blood thrown out into its sheath, and the pain may perhaps be greater than that of the ligaments at first, but by rest it is sooner removed. In this sort of cases, however slight, it is of the utmost importance that the injured parts should be kept in perfect quietude for the first few days, without which they will often linger and cause a lameness for months.

Those bruises which occur to the parts of tendons or ligaments just at their insertion into bones produce long and considerable pain, and are of such a character as may lead to the suspicion that a very serious injury has been produced to the bone or to a neighbouring joint. The insertion of the deltoid muscle into the acromion, and of the ligament of the patella into this bone, when patients in falling strike these parts, offer the most common cases of this description. These injuries cause the greatest pain and difficulty when the muscles are put in action, and the parts are often very long before they recover.

Many cases occur of contusion of the knee joint without fracture or other injury, in which the synovial membrane becomes suddenly distended with effused blood. This distension of course is the cause of great pain, which, however, quickly subsides on the use of local bleeding and rest; and this relief occurs so soon that I have often seen the swelling considerably subdued on the day following the accident. This is consonant with the course that I have before alluded to, when speaking of the state of the limb where a large vein has been ruptured. The synovial membrane seems to be capable of quickly absorbing blood, a fact we also observe in the fracture of the patella. I have never discovered that any ulterior derangement of the joint has followed these accidents.

In the large masses of effused blood that are often the consequence of severe hurts, the serous portion will sometimes soon become absorbed, but the coagulum will often remain a long time; this will occasionally excite considerable irritation with the formation of abscess. These cases terminate favourably. The removal of these effusions takes place in the best and readiest way when the structures in which they occur are most organised; a result which might be inferred.

It has been noticed by observers, that an occurrence happens to young children in falls upon the head that may puzzle surgeons. After the fall a considerable effusion is produced under the scalp, hardly rising above the surface, but the boundaries of this appearance are hard, giving the feel of a ridge formed in the aponeurosis, and just that softness which a moderate effusion might offer; it may readily present itself to the observer as a fracture with depression. There are probably no symptoms to support this suspicion, and a few days prove the fallacy of the impression made by the mere touch. The effusion has been absorbed, and all inequality and hardness around it have disappeared. But sometimes this small effusion increases to a large size, and presents a very formidable aspect. If it seems going on to increase it may be let out safely, and will then soon get well, but if it has stopped increasing this need not be done, as it will then be absorbed, and do well without any ill consequence. Of course effused blood will readily gravitate, as is so often seen when effused into the loose cellular tissue, and if by means of a blow on the forehead blood is poured out, it will always quickly get into the fine tissue of the eyelids. This, as well as the slight effusions between the conjunctiva and sclerotica, seem to act simply as a stimulus for relief, and the blood is very soon absorbed.

I believe it to be admitted that there are individuals so constructed in their particular organisation, that they are liable to continued hæmorrhages from the slightest wounds in any part of the body. Indeed, all practitioners must have observed that there are shades of difference in the aptitude wounds have to bleed in different individuals, and we can readily conceive that this peculiar condition may ascend in the scale of the hæmorrhagic disposition to a high degree. The knowledge of this fact is important, and requires to be duly weighed by the practitioner in all deliberations connected with operations, and particularly in adopting the unreasonable proposition of tying large arteries for the purpose of arresting bleeding from slight wounds. A most desirable object would be obtained by securing some remedy that would alter this peculiar disposition in vessels to bleed, and arrest the loss of blood, so that it may not continue to endanger the life of the patient. I have so invariably found turpentine infallible in effecting this intention, that it may, I think, be depended upon as a most valuable remedy.

Some years ago a youth was brought to me who was passing blood in his urine. I ordered some draughts, with a few drops of oil of turpentine; the bleeding quite stopped before the end of the second day, and did not return. About a twelvemonth afterwards he was brought to me, having cut his finger, but slightly; it had continued bleeding for some days; I gave him turpentine again, it stopped in a day or two. Not long after he came a third time to me; he had a tooth extracted, and it had been bleeding for several days; the turpentine was had recourse to, and the remedy soon acted in the same sanatory way. I have several times been called in on account of hæmorrhages where teeth have been extracted, and have never seen the turpentine fail in this, nor in other similar cases of hæmorrhage. Not only is the administration of this medicine by the mouth so efficacious, but the local application is also powerful in stopping bleeding, and happily so, as it anticipates the time the other method requires for effecting the purpose; at all events, it is a powerful auxiliary. The use of it is to be made with the injunction that no coagulum should be allowed to remain upon the part. I was on the point one day of leaving London for a few hours, when I was called upon to a case of bleeding from the socket from which a tooth had been extracted, and that in considerable quantity, the subject being a weakly middle-aged female. My confidence was such in the power of my means, that I left instructions to clear away the coagulum, if any, and to apply turpentine to the part, and I ordered draughts of it to be taken, and went away without waiting to see the effect. I learnt afterwards that the bleeding had soon stopped, and the medicine internally was not wanted.

The most important step in managing all cases of bleeding is, that the surgeon should be most careful to keep the bleeding vessel free from all coagulum. The smallest arteries will go on bleeding if they are covered with a clot, and many considerable hæmorrhages will stop if the bleeding points are quite clear from all blood ; even rather large arteries will sometimes permanently cease to bleed, if kept uncovered and exposed to the air. This fact I have seen. It is known that if a divided artery be in contact with a layer of fibrine, it has a strong affinity and aptitude to shoot into it, and it is possible that a clot of coagulum has a modified effect of this sort upon the orifice of an artery, so as to keep it from contracting and closing. It is, however, certain, that a coagulum over a bleeding artery keeps up hæmorrhage. It is by this means that all styptics have generally failed, while for the most part they have only done what bare exposure will generally effect; if the blood be carefully removed, and the styptic be applied, it has the credit of supporting its character, but generally, if the blood be removed and kept from forming a coagulum, the vessels will cease bleeding, as the effect of the mere exposure of the part. The doctrine explaining the use of plugs of coagulum about an artery, to restrain its bleeding, was never to me very convincing. I know practically that arteries of a considerable size, such as those about the hand, of the size even of the radial, will cease to bleed if left quite exposed, and kept freed from the formation of coagulum taking place about them; so, when the socket of a tooth bleeds, if it be kept quite clear of coagulum, and the oil of turpentine be applied, it will succeed in quickly arresting the bleeding.

I have every reason to feel assured, from what I have tried in these cases, that the bleeding may be stopped in epistaxis upon these principles, by which the patient may be saved from the annoyance of what is called plugging. The plan of the proceeding that I have adopted is to keep the parts which are bleeding freed from all coagulum, and this should be done in this case by syringing the nostrils, so as to wash the blood out. Now if a styptic be used, such as the sulphate of zinc, it coagulates the blood as it issues from the vessels, and so far stops the bleeding; but there is a process going on, by which this clot is loosened from its adhesion, and, perhaps, on the second day the bleeding is renewed. This will happen repeatedly;

so that these cases have ended by being plugged. But what I contend for is, that if the syringing be carried on until the bleeding ceases, it will not only stop, but not recur. It is generally considered of importance, that the water used in cases of bleeding should be cold; but from what I have observed, arteries will contract under the use of warm water, which has a better effect in clearing away the clots, and keeping the parts clean from the blood. I have already alluded to the influence of a coagulum in keeping up bleeding, when speaking of the necessity of squeezing out the coagulum in a pile when it is opened.

It is a frequent embarrassment to the practitioner to find, that after he has applied leeches they will go on bleeding beyond all expectation, and soon place children in danger of life. I have often been called in upon such emergencies, and never found the following expedient to fail, simple as it is. I wind a very small piece of lint into a hard knot, so as to be less than a pea, and wiping the orifice quite clean of blood, and placing this little pad upon the bleeding point, then taking advantage of the elasticity of the integument, I draw a strip of adhesive plaster tight over it. This has been quite enough to stop it perfectly, and on the third day there is an end of the wound. The point to be observed particularly in this application is, that the strip of plaster may be long enough to ensure a steady pressure of the pad by drawing up the integuments from a distance, by which the elastic quality of this structure gives a permanent pressure ; but even this pressure should be confined as much as possible to the bleeding orifice.

An extension of this principle has enabled me to carry out the plan so as to arrest the bleeding from arteries of tolerable size, such as the superficialis volæ and the superficial palmar arch. The practice I adopt is to use a hard boss of lint, larger than that for leech bites, but yet not more so than to cover fully the bleeding artery, to clear all coagulum away, and then press this boss upon the artery. As we are to get the elastic power of the integuments to keep up unremitted pressure, it will be necessary that this boss should have other pads placed over it, when it lies below the level of the surrounding parts, in order that the pressure may take effect. But in this instance there is no other application to be made, except upon this very spot over the artery; the rest of the wound ought not to be closed in, and no other covering except a piece of lint laid loosely on it ; the lips of the wound are not to be brought together, nor is the pressure of bandages to be used. When suppuration has fairly taken place no further bleeding will ensue, and the pressure may be taken off. Security has so certainly followed this plan of treatment, that I have the fullest confidence in it. Allowing the object to be fully obtained, it is a striking advantage over other methods that are usually had recourse to. All surgeons must have had the opportunity of seeing the difficulty and tediousness of securing the cut ends of the superficial palmer arch, and we know of the extraordinary propositions that have been followed out of tying both the radial and ulnar artery, for the purpose of stopping bleeding from the arch. Now the long time employed in seeking for the divided artery in this part occasions great disturbance in the parts, and particularly as the tendons of the muscles are so obnoxious in the search, that even if the arteries are secured, yet the disturbance must very likely lead to the formation of extended suppurations, and ultimately to adhesions between the tendons and the adjacent parts; and this will certainly happen if the injurious effect of pressure of bandages be added to such a wound. Where the bleeding from these arteries is stopped by what is usually understood by the force of pressure, I conceive that serious inconvenience will arise from the use of it by the production of adhesions between the adjacent tendons and the other parts, thus impairing the use of the hand for a long while, if not permanently. I have seen this happen, but on the plan I advocate there is no pressure beyond the point of the bleeding vessel, and the rest of the wound being left free and relieved from all compression, heals even better than in the other case, and without producing any agglutinations of the structures. With this simple and certain expedient at hand, how preposterous must it be to tie the radial and ulnar arteries to arrest the hæmorrhage from arteries in the hand.

The rupture of a superficial vein of the lower extremity is not unfrequently a case offering itself at the hospital. The large quantity of blood often lost in this way makes them very important cases.

The immediate stoppage of the bleeding, by placing the patient in a horizontal position, should always be borne in mind. We recognise here the power of gravitation on the fluid in the vein in the erect position, yet there must be an influence in opposition to the principles of hydraulics, to carry the blood onwards, for if there were not, the bleeding would not so quickly nor so completely stop on the patient lying down. There is also reason to infer from this fact, that the circulation is carried on much more tranquilly in the horizontal position of the limb than when the body is erect; which we acknowledge as a principle in selecting our mode of treating affections of the lower extremity. So much influence as gravitation can exert must be met by a proportionate increase in the powers of the circulation, in order to keep up the due current of circulation in the veins.

These cases do not always occur in those who have that thickening of the valves of the veins which commonly accompanies varicose sores, but in those whose cutis is of a delicate texture, and whose veins are enlarged but not thickened. Veins in this condition often give way without the previous existence of an ulcer, but the rupture is commonly the cause of its formation. Of course the treatment is rest, and pursuing the proper mode of healing the sore. The sore should be well healed before the patient moves upon the leg.

I am so fully impressed with the efficacy of friction for procuring the healthy state of veins, that all persons who have varix should not omit the flesh-brush, which will do more than bandages, or any other contrivance, to strengthen and restore veins. Females rather lusty, who have borne children, and in whom the saphena vein in the thigh is apt to become prodigiously enlarged, are very subject to these ruptures of veins.

The very great proportion of ulcers of the legs that I have to treat in the hospital are the result of disease of the veins. The varicose ulcer is by far the most common, so that bating the specific sores, injuries of the leg, and some from amenorrhæa in the female, nearly all sore legs present this character. This ulcer is singular in appearance, and has well-marked features. The inconvenience and pain caused to the patient are much beyond the apparent amount of excitement. Its situation is almost always just above the inner ankle, if the large saphena is the vein diseased, and the same place on the opposite side, in case it is the smaller saphena. It presents a breadth of irritation of some size, but having no defined regular boundary, of the diffused orange colour, unequally extended round. It gives great pain, and rather of a distressing kind than intense; this is often the case, even without an actual sore: but generally the surgeon is not called upon to advise upon the case, till at least a sore is produced. This sore occupies but a small part of the disease of the skin, and above all, if it be seen early it has not assumed the character of an ulcer, it is shallow, and may be described as an abrasion. The unvarying pain, with the absence of active inflammation, and the slight sore, are the characters of this complaint.

It is right to advert to the condition of the pain, which is described as being very bad by day, but far worse by night, so that the patient is often obliged to walk about his room, not being able to keep in bed. This, I have no doubt, is a true representation, as it is accordant with what we find on other occasions. If a joint labouring under the first commencement of synovial disturbance be much in motion during the day, and on the exercise of the joint the pain is so slight as not to attract the attention of the patient, particularly if he has the power of bringing to the relief of the joint some provision for lessening the effects of pressure, as in the lower extremity, where the elastic construction of the foot can be brought into play by resting on the toes, the pain is not felt; but at night it harasses the patient with an irksome distressing uneasiness, so as to keep the sufferer awake for some hours. So it happens in the varicose disease of the leg; the patient suffers much at night, and in his exclamations against bed, deprecates the possibility of his keeping it for a few days, which is so absolutely required for his getting well. This pain, however great, if the patient will keep his bed for one night and day, will become trifling the second night, and quite cease the third, so as to leave him easy and comfortable, and convinced of the reasonableness of the advice. This nocturnal aggravation of pain probably arises from the same cause as when a tight shoe, &c., is worn for some hours, although it may have been painful during this time, yet it is increased to something like torment after it is taken off. The vascular system, pressed upon during the day, bursts into more activity when the compressing force is removed. The sore, when formed, is quite superficial, and will continue so, for it is not usual to see a deep ulcer from varix, except where the applications made to it have produced loss of substance, or where the sore has been allowed to go on unhealed for a very long time. The advice to the patient, that he should lay up and get rid of the previous diseased state of the integument, if followed, would be most valuable; but the surgeon is very rarely consulted until a sore has been formed. If, before this has taken place, the veins running to the discoloured skin be carefully examined, they will be found thickened, and their valves indurated. This state being the cause of the sore, the aim of the practitioner should be to remove the tenderness which the patient feels upon pressing these veins.

This state of limb occurs for the most part in those who from their occupation are forced to stand a great deal, and have not much locomotion: thus cooks, and other female servants, form a great proportion of those liable to this complaint. In varicose sores, it is very common to find a vein or two going to the part tender upon pressure, this being also the seat of pain. These feelings are removed by leeches, and the effect of this relief has been such as to cause the sore rapidly to heal, indeed sometimes with astonishing rapidity. And as the sore entirely depends upon the state of the veins, this advantage may be well calculated upon. The necessity of rest, and the horizontal position of the limb, is too apparent to dwell upon. In the first part of the treatment, soothing applications are best suited for relieving the pain, and bringing the surface to a healthy aspect; after which the alterative dressings, such as hydrarg., nitrico-oxyd., most generally answer best.

As veins anastomose even in their primitive trunks, a freedom of space always exists for the blood to move into. We find further, that, from their structure, they are more endowed with the power of varying their size than arteries, for the sake of accommodating themselves to their contents. In phlebotomy, and the ordinary injuries of veins, the wounds readily heal, unlike those of arteries. There seems to be, on this account, no difficulty in believing that diseased veins may be restored to their original healthy state, if placed under favourable circumstances for such a change; that is, if no external cause impedes their functions, or interferes with that legitimate influence which these always exert in restoring the perfection of a part; and thus the veins of the leg, when diseased, will, if the limb is maintained in the horizontal position, and in perfect repose, gradually recover from the state of thickening, and induration of the valves. This fact I have observed; but we have practically a difficulty in effecting a perfect cure, as the time for fully producing the benefit must be considerable.

Varicocele is a case especially marking the beneficial influence of placing the veins in a situation by which they may exercise their functions in the order most according with their natural state. Without adverting to the usual way of accounting for varicocele, I shall only notice that I have invariably found that the condition necessary for its production is a very relaxed scrotum, which is a state by which the veins are placed out of those limits included in their original endowment. If a system of vessels be ordained to exercise certain functions in a given extent of surface, and by some supervening cause this is increased, then this alteration becomes the excitement to the vessels of the part to accommodate their size and elongation to the changes thus produced. In this way I conceive the elongated scrotum causes the variation in the structure of the veins to meet the altered condition of it. It is only to place the patient in a state where these vessels exercise their function without being oppressed by inordinate exertion, and they become healthy and restored to their natural state. I have seen this often take place. It is the relaxed, or perhaps the superabundant quantity of scrotum, that presents itself to the surgeon as the cause, and it has been proposed to cut away a portion of this structure, that the testes may be braced up to the pubis. This is by no means a mild operation; for if the tunica vaginalis be only very slightly cut, it will be followed by all the excessive disturbance in the system that the suppuration or inflammation of this part induces.

I had in the hospital a young man with a scrotum, so much enlarged, that it extended half way down his thigh. On the left side there was a very large varicocele, the veins being much enlarged, and their valves thickened. I kept the patient in bed for about three or four weeks, and the veins resumed their usual state of health; there was not the least indication of varicocele now remaining. He left the hospital apparently well, but before long he returned with a relapse of the disease. I then removed a portion of the scrotum, which was followed by considerable inflammation and great disturbance of the constitution. He ultimately left the hospital well; but I had no opportunity of seeing him afterwards, and therefore of knowing whether the varicocele was permanently cured.

I have not seen the varicose sore often in those cases where the patient has a delicate integument, and the parietes of the veins are apparently so much extenuated that they become largely dilated when the subject is erect, and immediately subside when the recumbent position is resumed. This is a state of varix in which the vein is apt to give way, and subject the patient to very serious hemorrhage; and in this case, it often leaves a superficial sore, of the varicose character. When the diseased vein lies in a bed of indurated cellular tissue, which sometimes occurs, I have seen, if the vein gets slightly inflamed, small collections of matter form in this thickened structure.

I have no doubt, that if patients would submit to the confinement, that by means of continued rest and leeching, when this step is required, all cases of varix may be fully relieved. I have not seen much benefit accrue from pressure or bandaging. But there is an application that I have found of the greatest benefit, particularly in varicocele, which is, the daily use of a hard flesh-brush. The effect of this friction seems to be very marked in diminishing the enlargement of the veins, and also in giving tone and elasticity to the scrotum. I think it has an influence on the veins especially, as I have seen it answer so well in varix of the leg. Of course the condition of the integument must be such as to allow the employment of rather a harsh remedy.

I have always been at a loss to understand the reasoning which has led to the adoption of the practice of obliterating a vein in a varicose limb. Varix is not a mere disease of a part of a vein, which the tying of the tube, or the removal of the part, can get rid of. It is the derangement of a system of tubes designed for conveying the blood to the centre of circulation; and one condition for properly carrying this on is, that the space in which the fluid is to move should be duly capacious. The breaking up of one channel must throw more fluid into those that are left open; and as the relief of all tubes under disease is just in proportion to the undisturbed course which the contents of the tube are allowed to take, so I apprehend this practice is really calculated to keep up the varicose state of the limb. I have seen cases where varicose veins of the leg have been tied, or divided, and where portions have been removed; but as soon as the patient got about afterwards, I have observed that the leg has been embellished with fully as many diseased vessels as before these several operations. I have already alluded to the circumstance of the frequent anastomose of large veins with each other, a fact quite enough to prove that their functions, to be rightly exercised, require the greatest freedom of space; and therefore, in estimating that power for repairing disease which the conservancy of function exercises over structures, this provision for preserving the channels free and numerous, must form an essential element in the treatment of the disease of veins.

I have insisted much on the beneficial effects of of long-continued recumbency of the limb in cases of varix, which is indeed very frequently an incipient form of phlebitis. This latter complaint affords the opportunity of seeing the value of recumbency and rest, and that they are of the utmost importance. The most common cases that occur, are those that arise after the operation of phlebotomy, which, with the observance of keeping the limb perfectly at rest in bed, and the application of leeches, usually terminate well; but if the arm is allowed to dangle in a sling, this slight affection may be roused to display symptoms of the most fearful character. I think the slightest injury of this sort should induce the surgeon to enjoin the strongest commands that the patient should keep his bed. This is a case in which a patient may, by this difference of treatment, be placed in a state to be quickly well, or in one of most serious danger. We find that veins, when injured, heal; and after phlebotomy this not only readily takes place, but leaves the tube perfect. This is mainly the result of the free and undisturbed exercise of its function when the limb is in perfect repose: but if to the irritation of the original wound, the injurious influence of constant motion be added, then all the dangers of active phlebitis of the part may be called forth. As far as I have observed, the treatment of this formidable complaint, in its most active form, is included in the full action of the bowels until good secretions are obtained; the application of leeches where they can be applied; and as the course of this inflammation is that which we find in other serous membranes, in obtaining the specific influence of mercury.

Although we may trace the greater number of sore legs to the presence of varix, yet we have in females another source for the origin and endurance of them, arising out of the amenorrhœal state, in whom, if a slight rub or hurt occurs, this trivial cause will readily originate a most troublesome sore, which becomes the field of action for the fitful influences of a perverted function, which at all times is prone to call forth its sympathies. It often happens that each leg is in these cases the subject of these revulsions; and if an ulcer exists, it most commonly establishes the vicarious menstruation once a month. Of course the first step in these cases is to restore the healthy function of the uterus.

We rarely see of late the large indolent sores which were formerly very common in hospitals. These were not only large in surface, but abounding in a mass of insensible granulations, rising considerably above the surface of the adjacent sound parts. This sort of sores appeared to give the patient as little pain as if they did not exist; and the chief annoyance seemed to be, the necessary process of dressing them; while the disease formed an excuse for idleness, and perhaps indulgence in drinking.

I have been disposed to explain this state of leg in the following way. The sore having been treated in a way to promote its healing, while the patient is allowed the free use of the limb, by which the processes for fully healing the ulcer are interrupted, while the continued exercise of the leg having called forth the powers of accommodation, these exercise their influence in depriving the sore of its sensibility, and thus the sore becomes adapted to the original economy of the member, the constitution showing no disturbance at a new local function being permanently brought into exercise.

A very important feature in ulcers of the leg is, that increased injury which attaches to them when they have penetrated so deep as to involve the fasciæ. This structure is not only never reproduced, when it has been destroyed, but no substitute is formed in its place; so that the muscles have not that freedom of motion which is produced by the very delicate and extensile tissue which connects them to the fasciæ, but they are really tied down to the cicatrix. In consequence of this, when the sore is healed, the action of the muscles irritates or even tears open the cicatrix, and the sore speedily breaks out again: thus the patient is doomed to the constant re-appearance of his disease, of which many in this state present themselves at the hospital. I observe that these effects occur more especially in sores about the calf of the leg, a part most obnoxious to the full exhibition of the evil. Long standing sores are very often accompanied by the loss of fascia.

One of the most troublesome kinds of diseases of the legs, is that condition of the cutis which seems to begin with an active eczematous eruption: the little vesicles run one into another till the whole cutis becomes altered in structure; by this change, of course, the cuticle becomes quite unnatural, and unfit to form a healthy covering. The secreting surface throws out a serous kind of discharge, that concretes, and the cutis is left exposed. This state gives rise to the most distressing pain, soreness, or itching; and these disturbances are very enduring. It may be presumed that this affection is the consequence of some functional imperfection, probably of the stomach and kidneys, and consequently in the assimilating processes. I have found that colchicum has more commonly relieved this affection than other internal means. The local measures require what may be called alteratives, or stimulants. Lead, zinc, and opium, may relieve for awhile part of the suffering; but they do not help in curing it. Repose of the limb in bed is indispensable in treating the complaint. When the active state has passed off, the pressure of a bandage often brings up the power of the circulation in the limb to the healthy standard.

In the list of sores of the leg I wish to place a very annoying one, both to the patient and to the surgeon; and the more so, as it is one for which the patient is apt to think the origin too trifling to be followed by any trouble. It has its origin in a blow upon the shin, probably so slight as hardly to make the patient aware of injury; but the integument has been much bruised between the bone and the obnoxious hard body; and this quantity of violence has really produced a small gangrene of the cutis, perhaps no larger than a sixpence; and in a few days this becomes very painful, particularly on hanging the limb down, and in walking; which always occurs when a dead part hangs, as it were, upon a living one. This part of integument of the leg is naturally not highly organised, and there is often a remarkable length of time required to throw this small slough off; but the most absolute rest is required, even for this slow process. The healing process may be often seen carried on up to the line of separation, which of course shortens the absolute time of cure.

That complaint which has acquired the name of whitlow is of various characters. The mildest form begins like a slight vesication, but which contains pus, and is of course relieved by letting out the fluid, although it is not always cured: even if the cuticle be removed, the same state of cutis creeps on, and detaches the cuticle around the circumference. There is an application which at once stops this progress, and restores the surface of the cutis to health; it is the resinous cerate. This will in a few hours often improve the sore. The disease called Onychia forms about the root of the nail, detaches the nail from its living connections, but still the parts are not robbed of the power of keeping up its growth. This is a most painful state of things; and, in the usual method of treating the complaint, a most torturing operation is resorted to, that of cutting or tearing off the portion of nail. All this pain the patient may be saved, by first getting the finger as quiet as possible by soothing measures; and when this is done, to insinuate a shred of lint, by means of a probe hammered flat, so as to press this small portion as far as it can go between the sore structure and the surface of the nail; and if this piece of lint be moistened with a weak solution of nitrate of silver, the beneficial effect will be apparent in twenty-four hours; the sores will heal quickly, and the pain will be subdued. The simple lint should be kept insinuated for some time, even after the sore is healed. The nail will grow to its usual length, and the hollow sore will be filled up before long.

As connected with the cutis, I may allude to the existence of warts, of which many cases of a severe kind occur. We find them most frequently in the pudenda of both sexes who have arrived at puberty. They appear at the early period of life; and I am certain they have a period during which they remain. If they occur under the age of puberty, they usually appear on the hands; and for such there is preserved an immense catalogue of remedies; but as they disappear when the period of their departure has arrived (for I believe they have always a limitation for their existence), so the last application acquires great celebrity. I have not the least doubt that they will depart at some given time, in spite of all hindrance. There is a noticeable fact regarding them, which is, that whatever magnitude the mass may have attained, when they have disappeared no mark of their having existed, remains on the part. I am led to think that this circumstance proves that they are in connection with some slight derangement which influences the power of sympathy over the parts. I have seen ulcers of rather a formidable character on the glans penis, apparently connected with an irritable state of the urethra, and which the passage of a bougie has apparently caused to heal. When healed, these ulcers have not left the least mark of a cicatrix; although, from the somewhat deep and rugged surface, this might be supposed impossible. We know how serious temporary affections from sympathy will be; and often that the slighter the primary derangements are, the greater will be the sympathetic affection. The slightest excoriation on the surface of the os uteri will produce the most distressing sympathies; whilst carcinoma does not extend the calamity of suffering beyond its own locality. Its own disturbance is too great, and too fixed, to pass to sympathetic affections beyond its own pains. I have seen the most benefit done to warts by applying opium in powder to them, by which their irritability is removed, and then perhaps they will disappear.

A slight influence, that ordinarily passes off by a single impression, will of course, by its continual presence, effect a complete alteration in the vital powers of parts. The fleeting impression of severe cold may, as a stimulus, animate the functions of life to improved state of health; but the same impressions going on continuously for some time, may reduce the strength of the powers of resistance or of accommodation, both which are indications of the vigour of the actions of life. This reduced state of vital power renders parts unable to sustain the stimulus of those excitements which, in the full vigour of the body, should carry on the functions of life to healthful reactions. Thus we see, as in a weakly sore, the stimulus which, when applied to a healthy one, would add impetus to the processes of reparation, will cause this sore to ulcerate and increase; so the frost-bitten part is likely to pass into gangrene if the stimulus of heat be abruptly applied. There are many who, in the usual cold of our winters, suffer from chilblains. This complaint appears to me to be the result of an abiding influence of cold depressing the vital energies of parts so much as to lessen their power to sustain moderate excitements, which usually only raise the processes of reparation. Thus it happens that chilblains are commonly produced by some slight hurt on parts which have lost the power of preserving their healthy state, from having suffered the depressive influence of cold. I have very generally been able to trace the complaint to some contingent cause besides cold. The influence of cold east wind on the surface of the body, and on the mucous membrane, is so well known as to lead me to attribute some of these diseases to similar causes. I have found that opium has the most beneficial effect, when used as an application to chilblains.

As cold depresses the powers of the structures to a degree which diminishes the ability of parts to resist the derangements that slight injuries may inflict, so that state of the arteries which we call ossification will do the same, but in a greater degree, by having a more unabating influence; as the influence of cold is temporary, that of diseased arteries is permanent. I have always been able to trace the state of senile gangrene to a slight injury, previous to its taking place. The state of ossification often exists without gangrene ever being produced; but if this state of arteries does exist, the merest trivial hurt leads to the disease. I have however often seen slight bruises occur in such subjects, and where, by good management, approaching gangrene has been warded off: that is, the vigour of the part, when assisted by art, may be just equal to resist the destructive influence, and to restore parts to healthy action. We accept as a law in pathology, that any given injury of a part must vary in its results in proportion to the condition of the circulation of that part. That the ossification of arteries must weaken a part, there can be little doubt; but still the circulation of the blood will go on undisturbed in its passage in this state of the vessels; and this will take place, although the artery be completely ossified, so as to give no sensation of pulsation. I once had a patient with a celebrated anatomist, who conceived that the radial artery did not exist, because he could not feel it pulsating: it was ossified. The slightest hurt on a limb, the arteries of which are ossified, may produce as destructive effects as the greatest violence in a sound state of parts: thus a slight hurt in a part, the vessels of which are in this state, will produce inflammation of parts which are supplied by ossified arteries; and this kind of excitement of the diseased vessels is really the cause of gangrene. We have here the excitement to action where there is no power to sustain the process; parts unfit for active life are destroyed by an overpowering stimulus. When arteries are diseased by the deposit of bone, the part is unable to bear any undue action, and the most simple cause is sufficient excitement to produce gangrene: thus the cutting of a corn has been the source of gangrene and death. The first deposit of bone in the coats of an artery is not always readily disclosed to the sense of touch. It is only by passing the finger up and down the artery that the sensation is given of the rings of ossification.

Before a part has really become gangrenous, there are often premonitory indications that such a state may possibly ensue, and something like a suspense in the result that will follow. I have often known cases where a most severe and unabating pain has seized a part which has ultimately become gangrenous, although this pain was not accompanied by any discolouration or other sign of approaching mischief. Some years ago a man was brought to the hospital in the middle stage of life, whose complaint was an excruciating pain which he suffered in one of his little fingers. There was no appearance of any thing unusual. He mentioned that some short time before, being a constable in a country parish, he was engaged in taking a thief, and in the scuffle had received a hurt in this part. On examining the arm, I discovered that the ulnar artery, instead of submerging under the superficial layer of muscles, passed quite superficially, and could be felt prominent all the way down, and it was beset with bony deposits. This circumstance readily explained to me the nature of the pain; it was the antecedent of gangrene, and the finger afterwards presented the purple hue. By treatment he went out well; and the precise features of senile gangrene, by timely treatment, were prevented from going into sphacelus.

Many years ago I attended a lady in at least three attacks of this complaint in the toes. The first had gone so far as to end in sphacelus, but ultimately healed; other toes were afterwards threatening, having the blue colour and little heat and pain: all the attacks were attended with the greatest pain. Of late years I had a lady a patient, who from some slight hurt, as in all the other cases, suffered very great pain in several toes of one foot, with the blue colour diffused over them. By early treatment she recovered the complete use of the parts. She suffered subsequently from two similar attacks, but recovered from each, and died suddenly some time afterwards in the country. The arteries of the lower extremity were ossified.

The foot and the leg are the parts of the body which we commonly find to be the seat of this affection, and many sores occur here which I feel convinced should be placed in this class of diseases, although no appearance of gangrene has supervened. As the leg is nearer the centre of circulation, so this complaint more commonly gets well when it occurs on this part than on the toes, without showing any indication of gangrene. I had under my care a gentleman with a sore on his leg that could not be traced to a recent hurt, but occurring in a part that many years before had been the seat of injury in hunting. I very soon decided that it was a sore arising under the same circumstances as gangrene, and in a few days it put on this appearance, the pain it gave being excessive. He had been a free liver, but was otherwise in good health, and unfortunately would not admit that a sore appearing so trifling in the beginning could be important in its consequences. The gangrenous state soon became sphacelus, occupying a great part of the leg, and he did not live long. We have in this disease not only excited action in the vessels that are affected by the attack, but the pulse indicates that the whole circulating system participates in their state. It is usually hurried, bounding, and full, but not hard; the tongue is furred, and the digestive organs in bad order. I have several times noticed in cases of aneurism that we have this sort of derangement of the pulse, which has become moderate and steady, as soon as the ligature has been put upon the artery. This is an instance, I conceive, of the influence which one division of the arterial system, when deranged, has upon the whole circulation.

The indication of treatment is to secure a quiet and due action of the circulation, as it is in a state of increased activity and diminished power; and those medicines, therefore, should be resorted to, which will best fulfil this intention. The great pain so generally accompanying the attack of this complaint has given to opium a great value for relieving this distressing symptom; but as the restoration of the powers of the stomach is so essential in the treatment, even this medicine may have its disadvantages. The diminution of the activity of the heart's action procures the cessation of pain, and the restoration and preservation of the appetite leads the way to recovery. I have never seen the great advantage of bark in the early part of the complaint; that which soothes and quiets the stomach in the disordered state of the digestive organs, is best adapted to restore its health and perfect function. As the disease, however, is essentially a disturbance of the circulation of the part, a most necessary point in the treatment is the strict repose of the limb in bed, where alone, in the horizontal position, the arteries are best disposed to return to regulated action. The cessation of pain, and the appearance of moderate suppuration, are the signs of a disposition to do well. So far from the accession of gangrene necessarily leading to sphacelus, many cases get well, particularly on the first attack, and the patients will often live some years afterwards. It is right to bear in mind, that as a very slight cause can set up this state of gangrene, although the parts are entire, so when the sore that may supersede the gangrene is doing well, a stimulus of undue strength applied to the part may, by calling upon the powers beyond their vigour, throw the sore into a renewed state of gangrene: which fact I have seen happen. As in chilblains, so in this complaint, opium has a happy effect as a local remedy to the part.

I had in the hospital a young woman, in whom the artery of the upper extremity became obliterated, and gangrene took place at the extremities of the fingers. It was not at all apparent how the artery had become thus impervious. The heart was weak in its action, although the patient was only nineteen years old. No pulsation could be felt in any artery of the left upper extremity, up to the scaleni muscles, and yet no parts were mortified higher than the fingers and thumb; which fact probably shows that the anastomosing system was equal to the support of the whole of the limb, with the exception of these extreme parts.

I have already alluded to traumatic gangrene as being the result of defect in the power of the heart, and that the complaint is only to be treated by sustaining its action on the first few days after the injury. But I observe that surgeons are apt to confound this state with that of sphacelus or slough, which is merely the effect of the intensity of the violence inflicted upon a part, and where the injury is simply local, without the presence of any alteration in the pulse to indicate that the system is on the brink of sinking. It is of the utmost consequence that the surgeon should discriminate between these cases; for where the death of parts is confined to the seat of injury, and the patient does not exhibit, by the character of the symptoms, that he is in a perilous state, there is time to see how far the effect of the violence has extended, and to watch the resources of nature in the course she takes for beginning reparation; in doing which, we not only do not submit the patient to an operation when he can least support it, but, what is very important, we can secure to the patient parts which through life may be of the utmost utility to him. It is, therefore, most desirable to have a clear view of the features of the two cases. In the one description, it will be right not to inflict an operation where the constitution is already succumbing under an irresistible change produced by the violence done ; in the other, it will be wrong to inflict an unnecessary injury, by operation, where the system upholds the power of conservancy and gives other signs for leading us to expect that useful parts may be preserved.

In connection with gangrenous affections may be classed those sores of the lower extremities which may be properly referred to disease of the centre, instead of the circumference, of the circulation. In cases where the heart is diseased, we see not only anasarcous swellings, but even the formation of sores. These, viewed in the same light, must be referred to the same treatment. But here also the sores may generally depend on some very slight hurt upon parts already disadvantageously disposed to exercise the function of reparation.

The nervous system also, when impaired, exerts an injurious influence over the preservation of vitality in the lower extremity, as is well known in diseases of the brain. A gentleman, who afterwards died of disease of the brain, had, from the most trivial cause, in the early part of his illness, a most troublesome and painful sore on his leg, yielding to none of the usual methods of treatment.

In a large hospital, cases are often occurring of very young children who have been scalded in the act of deglutition, by attempting to drink boiling water out of a kettle. In the attempt to swallow the heated fluid, the child is too quickly alarmed by the pain to complete the deglutition of it, and the water is no sooner in the mouth than it is, in the generality of cases, immediately got rid of. But yet the tongue and mouth are scalded, and the membrane of the fauces, and even the glottis, partake of the effusion and swelling, so that the patient seems to be threatened with suffocation, and even the mildest cases are of a fearful character. From the way in which, with this injury, the patients swallow, I have conceived that the œsophagus is not usually much affected. By the application of a leech or two, according to the age, and the administration of calomel and antimony, in most of the cases the symptoms have subsided in twenty-four hours; often the breathing has become free immediately after the application of the leeches.

It may not be altogether impossible to form a tolerable scale for measuring the destructive power of heat at various temperatures, but there are many circumstances to be nicely estimated before we can arrive at a satisfactory result. With respect to scalds, we do not, in the first place, know the degree of heat of the fluid. If it be applied through the clothes, we do not know the reduction of temperature that the transmission through them produces. The duration of the presence of the heated body upon the part is also an element in the calculation. The quality of the fluid in scalds is a most material point to be kept in view. However, in any circumstances, we have a most material condition that influences widely the character of this injury; it is the vigour or weakness of the individual scalded or burnt. We may assume, that under all circumstances, there is a more limited range in the intensity of the heat applied in the former than in burns. It cannot in mere water exceed the boiling point, and may be several degrees below it: thus, in the ordinary run of cases, where the health of the subject is tolerably good, and the heated fluid is only water, the effect stops at raising the cuticle into vesications; but if the subject is weakly, even boiling water will produce a slough, or death of the whole or of a layer of the cutis vera. I have seen extensive sloughs formed in delicate children under these circumstances. But scalds produced by boiling fat, coffee, beer, &c., have produced, even in strong healthy men, considerable sloughs. I have lately had a case of a vigorous youth who was scalded by boiling beer, where the whole cutis of the leg was reduced to a slough. In the results of bad scalds, there are two circumstances that seem to prove, that the worst scalds are not produced by so intense a heat as even the mildest burns. They often do not destroy the life of the whole stratum of the cutis, so that when the process of cicatrization commences, the sores will be seen to heal from small points in the centre, and not wholly from the circumference; and, further, there is not that state of the tissues under the sore which produces those strong bands that distort the neighbouring parts, when the whole has been healed. The usual course of scalds is, therefore, to heal rapidly, when they are brought into a quiet condition favourable for the process of cicatrization.

I have often had cases brought from neighbouring iron foundries where burns have been caused by melted metal falling out of the pans in which it is conveyed to the moulds, upon the upper part of the feet of the workmen. Here the matter is heated to such intensity, that the most fearful consequences might be anticipated from its effects. It does indeed produce death to the part it touches, but its consequences otherwise are of a less magnitude: it falls upon the part, but its weighty quality prevents its dwelling more than an instant on it; the contact, is momentary, and the destructive matter only touches the living parts to start away. It does enough to produce a slough of the surface, but its deadly influence goes no deeper. Thus this sort of burns does not leave the evil consequences which arise from the altered condition of the tissues beneath the skin. When the slough is cleared away, they heal with a small cicatrix, and leave no obstruction to the use of the parts.

Another kind of burns that present themselves are those occasioned by persons subject to fits, or who are idiots, falling upon the fire. I have had many of these cases, and not unfrequently a repetition of the same accident in the same individual. This mode of application of the heat here produces a greater degree of mischief than the last, since the contact of the heated body with the parts is of longer duration, although the heat may be below that of melted metal. These burns produce that altered state of the parts beneath the integuments, which I shall now allude to, as giving to the injury a character that we do not observe in many other large sores.

The great peculiarity, in the large sores produced by burns, will be found to arise from the radiating property of heat. The intensity of the radiating heat being in proportion to the distance from the heated body, of course the greatest destructive effect must be produced on the surface of the living structures, whilst the subjacent parts may undergo changes not destructive, but yet important to the future progress of the case. Most injuries are produced by forces limited in the duration of their possible action; whilst heat may be unlimited in the degree, extent, and duration of its action. If an individual be burnt by means of his clothes taking fire, there must of course be a series of changes going on in the structures exposed to it until the burning material be removed; and these changes will vary in degree according to the amount of heat to which the parts are respectively exposed. If we now view the whole of the parts subjected to the heat, we find that, instead of the natural extensile quality of the integument and of the delicate cellular tissue, there is now a mass of indurated structure calculated to resist the approximation of the edges of the sore, and retard the consummation of the healing of it. Indeed, it is this peculiar condition of parts that baffles the intention, when operations are undertaken for relieving the deformities that burns occasion.

The characteristic quality of a sore from burn is, that there is not only the sore which the slough has left, but also that there is a dense structure of agglutinated tissue cemented together, forming a substratum under the sore; and this unyielding base produces a difficulty in the progress of its healing. If we make a slough with a piece of fused potass, until the substance of the cutis be destroyed, when the slough has come away, as the subjacent parts do not participate in the irritation of the caustic, so as to produce thickening, the sore gapes and opens to the extent which the elastic quality of the integuments will allow; and if it were permitted at once to heal, as the skin is not bound down by any thickened structure under it, it would contract into the most trifling scar; the medium that closes the wound is absorbed almost as fast as the cicatrix is formed. I have had many immensely large phagedænic sores forming about the groins and thighs, arising from that state of diseased skin which so often takes place after buboes. This disease does not seem to involve the tissues under the skin; and although the sores themselves may have been very extensive, yet on healing they leave but a comparatively small cicatrix. The fact is, that when the dead part of the integument is thrown off, we find no thickened or altered state of the parts underneath, by which the edges are left, as it were, free to yield to the extensile quality of the skin, and thus is produced a greater breadth of sore than the mere loss of integument would indicate; and, on the other hand, when the medium of granulations is formed by the progressive and rapid contraction of the healing, the edges are made to approximate so as to leave a very small scar.

Some years ago I had a gentleman under my care with most extensive mischief of this sort. The sore was of an immense size, extending from the groin round the inner part of the thigh to the nates, in such a way as to incline one to suppose that when healed he would not be able to stand upright. However, this extensive ulcer did heal, leaving but little scar and no contraction, and he has regained perfect freedom of motion of the limb in every direction.

This substratum of thickened tissue, by binding to itself the edges of the sore, is most adverse to the ready healing of burns, when large and deep. We often find that these sores will close up to a certain point, and then fairly stand still, although all the varieties of stimulating applications and other resources of surgery have been resorted to. Still, in the course of time, I have often seen these large unpromising sores heal: probably, by slow absorption, the edges get freed from their close connection and are allowed to approximate. In lean subjects, in whom the integuments are very thin, the influence of the heat in altering the condition of the structures will extend through all the layers of the integumental covering, and therefore the sore will be impeded in contracting. On the contrary, in those who are fat, there will be some strata little, if at all, acted upon, thus more readily allowing the ordinary healing process to take place. I have observed that, in children, if the subject be fat, the process of healing in burns goes on particularly favourably, even in very large burns, so as to close up without diminution in the rate of healing. Of course these fat subjects generally are more robust than the lean, and this circumstance must have its weight in the view of the subject.

A few years ago a young man presented himself to me who had been burnt on the upper part of his back, when he was much younger, and in whom the contraction occasioned by the cicatrix had drawn all the integuments downwards, including a part of the scalp, which was pulled backward from the forehead, and the hair, which should cover the occiput, being drawn down in a pointed form between the scapulæ. This is a fact indicating to the surgeon the very great assistance he can depend upon, in the extensile quality of the integument, when he suggests an operation for remedying imperfections arising from burns. In undertaking operations with the view of releasing contractions that follow burns, there are certain conditions he should observe: the one is, that in making his incisions, he should completely divide all the condensed structures till he comes to a layer of loose healthy tissue quite free from any thickening; the other is, as might naturally be inferred, that, the object being to remove the difficulties occasioned by a cicatrix, no new cicatrix should be added to that which must necessarily take place; and therefore it is folly to cut out flaps from adjacent parts to fill up the gaps that are made.

I imagine that in cases of burns, the whole of the destructive influence is expended before the surgeon sees his patient, and therefore he has no means of diminishing the actual injury that has been produced upon the parts. I have seen a great variety of applications employed without having any great preference to one in particular. The patient always feels ease by having the part excluded from the air. The first important stage in burns, is that which precedes the establishment of suppuration. This is analogous to what we observe in all great lesions: there is a struggle in the constitution at this time to exert the first steps of the reparative processes, and if the powers of the patient are unequal to it, he will probably die, even if he has rallied from the first shock, which is rarely the case in very severe burns. And as in all cases where large sores remain to be healed, the patient has always the possible mischief to fear in an attack of erysipelas; a circumstance not to be forgotten in our prognosis.

I am by no means disposed to regard erysipelas as infectious. There are conditions in the state of the body which readily lay it open to the influences of the atmosphere, in deranging the functions of the economy, and in establishing disease. This condition for establishing erythematous erysipelas, I have reason to feel assured, is the disturbed state of the secretions generally; and when the economy of the system is deranged in this way, the atmosphere becomes the exciting cause. We have many analogies in the influence of the atmosphere on the body for considering it as likely to produce the complaint, under certain states of the system. We attribute to this cause changes in the state of the mucous membrane of the nose, of the fauces, and of the air passages; and the surface of the body is, in pathological circumstances, closely allied to these structures. When we discover errors in the secretions, we may anticipate the commencement of erysipelas on the slightest lesion of the skin. As the attack commences, the secretions are not only vitiated but in a measure suppressed. If the patient has a common ulcer, which before was going on well, the formation of pus suddenly ceases, and only a little orange coloured moisture appears on it. The alimentary canal is deranged, the biliary secretion is altered, the motions are black; the urine is scanty and high coloured; the skin is dry; the tongue is very characteristic, it is white, but not loaded on the surface, with the edges more than usually red; the pulse is small, quick, with a sensible jerk, but too weak to make a striking impression on the finger. Of course the appetite is lost, and the digestive powers much deteriorated. This state of the tongue, and that of the pulse, I have never known to be absent in erysipelas, and when these two symptoms are present, if a few leeches be applied on account of some local complaint, erysipelas will surely attack the part.

It is a striking circumstance in this complaint, that almost on a sudden the tongue will become clean, and the pulse subside into a slow and tranquil action, and contemporaneously every mark of erysipelas will disappear. As the essential character of the complaint seems to be a suppressed and disordered condition of the secretions, so it is to the resources we may have for correcting these functions that we must refer for the treatment. The first step for accomplishing this intention is to clear out the bowels, and we must then resort to such medicines as are adapted to promote all the secretions. The impaired state of the stomach restricts the administration of nutriment to diet of the mildest quality, and the character of the pulse will not allow the excitement of the usual stimuli. I have invariably observed, that the quickness of the pulse bears a close relation with the state of erysipelas on the skin; and that when the complaint has appeared to be fading off, and the pulse getting slow, on the administration of wine, and more particularly of ammonia, the erysipelas has sprung up with renewed vigour. As the general treatment, in my opinion, consists in tranquillising the increased, although feeble, action of the circulation, and in restoring the impaired functions of secretion, so also the local treatment should be that which can best soothe the parts, and restore the healthy secretions of the surface; for which warmth and moisture seem by far the best adapted.

The essential nature of the complaint seems to be a state opposed to the exercise of the suppurative process, and when sores affected with erysipelas show any indication of producing pus, the inflammation of the part then ceases. If the attack has been on the face, one of the presages of a happy termination will be the formation of a small abscess in the fine tissue of the eyelids ; this quickly forms, and should be speedily let out by a small puncture. As soon as this pus is formed the redness of the face begins to fade away, the pulse and tongue improve, the skin becomes moist, and the stomach is not so intolerant of food. As the complaint subsides, the greatest care is required in the management of the diet, and too much attention cannot be paid to secure a regular state of the bowels; if any accumulation is allowed to take place in the lower ones, this will readily cause some signs of the revival of the disease.

Erysipelas leaves the patient exceedingly weak, and restoration to the usual state of health is often very slow. The frequent revival of mild attacks seems to depress the powers of the constitution even more than one of a severer kind. It will happen, that if erysipelas attacks a person who has besides some previous organic disease, it will often continue, notwithstanding the best treatment, shifting its seat, and assuming changes in appearance. If the pink or orange tint gives way to the bluish or brown appearance, then the prompt administration of stimuli is strongly indicated. The pulse will then give full indication of the sinking powers of the constitution.

I consider that in all those slight hurts that so often lead to phlegmonous erysipelas, it is of the utmost importance that the most perfect repose should be given to the part, and even the slightest cases of the sort occurring in the hand require that the patient should be kept in bed; by doing which he will preserve his hand unimpaired, when otherwise, if the limb is not so secured from motion, the fingers or the whole part may be lost to him. In this form of the disease it is often necessary to make incisions, both to diminish tension when great, and more particularly to let out matter, when the surgeon is assured that it is formed. In doing this, I know it will be sufficient often only to divide the skin and superficial fascia, leaving the deep fascia of the limb untouched. This is important to bear in mind, as it is hardly possible to divide the deep fascia without its going into slough to some extent; and thus in healing, the structures, particularly the muscles, are seriously injured in their functions, and the cicatrix is liable to break open on the muscular exertion, or any violence to the part. All cases do not require incision, and none very large or deep ones.

Many cases present themselves at the hospital of this complaint at the elbow, arising from blows or falls upon the ancon of the ulnar, which produce inflammation of the bursa over this part, and suppuration of it, the integument also participating in the mischief. These cases prove to be instances of the decided benefit of keeping the patient in bed, as they generally do well, although they often exhibit a formidable appearance. The inflammation of the bursa soon resolves itself into an abscess requiring a speedy opening; after which the wound quickly heals.

I have often noticed, that when erysipelas has attacked a patient who has had a long standing disease of the skin, on the cessation of the inflammation, he has become quite cured of the chronic disease.

There is an appearance on the surface which is often regarded as erysipelas, but which is of a different character. I allude to that erythematous blush which the skin exhibits when deep structures are inflamed. Chronic abscesses, when opened, will often appear to be doing well for the first few days, after which the cyst will become inflamed, and this blush makes its appearance, defining correctly the limits of the abscess. Often in inflammation of the synovial membrane of a joint, the surface over it will give the same expression. In those injuries from violence, in which the deeper parts suffer more than the superficial, the same appearance of blush will present itself.

In making mention of chronic abscess, it must be evident that there is a great variety in the conditions under which this term may be applied. In this class of complaints we are rarely able to attribute any one simply to the result of inflammation of the part in which they occur. They are not those abscesses which Mr. Hunter described as of the part, but rather those he mentions as in the part. They are, I conceive, always depending upon some previous change in a neighbouring structure, and as far as really local treatment can have effect, it must be directed to the primary disease. We usually find some contiguous bone, ligament, or fascia to be the part at fault. These abscesses are of course formed under the fascia, and involve parts of low organisation, and therefore when the inflammation is excited in them, the constitution may be disturbed in a way to endanger life. It is not unusual to find, after opening a chronic abscess, whether the aperture be closed or not, that the case appears to be going on for a few days very well, when the cyst all at once becomes inflamed, a condition which is generally indicated by the blush on the surface; simultaneously the pulse becomes rapid and weak, the tongue coated, the skin hot and dry, with thirst, and complete loss of appetite; there is great pain in the part, and the nights are passed without sleep. This is a state which has been rightly called irritative fever. The strongest feature of it is the almost sudden and complete prostration of strength. It sometimes happens that the constitution never rallies from this great depression, and the patient dies; more commonly, after a period of great anxiety to the attendant, the system gradually gets tranquil, and the patient slowly regains his powers. It is a very considerable time before the discharge of the abscess begins to lessen, and it often continues so long that the patient sinks into that state which is called hectic fever, a condition quite different from that of irritative fever.

Those abscesses which are attributed to phlebitis and the absorption of pus, are well marked as to character, but we occasionally meet with others similar to what were formerly common in severe cases of small-pox. They are often seen in infants; and as there is not that vigorous action present, by which lymph would be thrown out so as to form a barrier limiting their extension, they rapidly increase to a large size, and require to be early and freely opened. These large collections often have their seat about the shoulders and hips; and although they bear so serious an aspect, the patient usually does well. In the enumeration of chronic abscesses I have not mentioned scrofulous collections of matter; but there is no doubt that many cases of this description may be so classed.

The series of grave events that follow in the sequence of inflammation of the cysts of abscesses, and the increase of liability to danger, when the opening is left unclosed, give importance to the means of ensuring the proper healing of these wounds. It has been proposed, as an ingenious way of evacuating the fluid, to adopt what is called a valvular opening, by which it was supposed that the two edges would have an adaptation of larger breadth of living structure to insure the healing. It was also suggested that by this method there was less liability of air getting into the cavity. These advantages are not found practically to follow this method. Flakes of coagulated lymph, or, what often has happened, a piece of fat, are often interposed, and defeat the intention of obtaining speedy union; but, what is still more likely, in squeezing out the matter in the usual way, the edges of the wound are excited to a state of irritation, and, perhaps, secrete serum instead of lymph. At all events, this method does not appear to have any advantage over those previously employed, and the proposed improvement has turned out to be fallacious. The state of the patient in irritative fever is, however, so serious, that it is the duty of the surgeon to seek some plan that shall save him from the impending danger of such a condition. I have of late years adopted the plan of letting out the contents of chronic abscesses by means of a trocar, and have found a very striking facility take place in healing the aperture, when this instrument has been employed. We see every day the ready way in which the wounds heal that are made in the linea alba in the operation of paracentesis, although the structure is not highly organised. The use of this instrument also causes a stretching of the part of the integument that is punctured, which is favourable for healing. Further, by leaving the fluid to pass through the canula, no flakes nor particles of fat can be interposed in the wound to interfere with the healing. One caution is required in adopting the trocar, which is, that the collection should be large enough to secure the point, when pushed in, from endangering the deep parts.

Many cases present themselves at the hospital of small abscesses in the axilla, occurring most commonly in young females, but occasionally in males. They are circumscribed in form and connection, being bounded by the tough fascia of the part; and on this account are exceedingly painful. They are distinct from those which are the result of inflamed glands, and have no connection with any source of irritation on the fingers. They are from time to time frequently of periodical occurrence, reappearing during the course of a few years. They should be opened early, and will do well.

A case which often presents itself in the hospital, is a true phlegmonous abscess around the knee. The subjects of it are always young female servants, who have had to kneel much: yet it is quite distinct from inflamed bursa. It spreads around the knee on either side, goes through its stages very quickly, so as to present a fair state of suppuration in a few days. It is extremely painful, being under the fascia of the thigh, and requires to be opened as soon as the case is fairly made out. The abscess very quickly heals, and the patient is at once relieved from pain and fever after the evacuation of the pus. I have not been able to connect these cases with any uterine irritation. The inflammation in this case comes on suddenly, and runs its course actively and rapidly; affording in this instance a proof that the processes of reparation bear a proportion in their energy to the activity of the disturbance which has called forth the reparative power. This kind of abscess also points out the fact, that when matter is once produced, even in the most minute quantity, leeches are harmful, as I have very often witnessed, in these cases especially. I have seen their employment in this way cause a diminution of the intensity of the inflammation, and so retard the full development of the abscess, yet not prevent its course, thus robbing the parts of their energies, so that when the matter has been evacuated, the further progress of the abscess has been languid, and very tardy in finally healing. I have invariably noticed the same effect from leeching absorbent glands. This remedy never absolutely stops the formation of matter: it only converts the active into a chronic form of inflammation, and the suppuration lingers in a tedious form. But there is another objection to leeches applied to glands: they are structures that are intimately connected with the surface, and therefore the bites often add to the irritation of the gland.

There are various conditions of the disease of the bursa over the patella, usually called the housemaid's knee. I have rarely seen them get well except when rest has been strictly followed. In the most common case, if it be recent, and the cyst not thickened, a few applications of leeches will effect a cure: but rest is still indispensable. When they are of longer duration the leeching is not enough, but something in the way of counter-irritation will be necessary, by which they will get well. I include all stimulating applications in this term. The thickening of the cyst does not bear any precise relation to the duration of the complaint. When the cyst is hard and large, I think I have observed most good derived from blistering. If the bursæ are very tender and painful, the synovial membrane then often becomes simultaneously affected. Occasionally they are presented to us in a state of suppuration, when they really give little disturbance to the constitution, and usually get quite well if the cyst has opened of itself, but if the surgeon opens these cysts when they are highly inflamed, and before pus is formed, they then produce a fearful disturbance of the system, and bring the patient to a condition of imminent danger; the parts around are also engaged in the active inflammation. This is another case to prove the beneficial influence which the secretion of pus has upon inflammatory action.

I have seen a fearful amount of constitutional disturbance ensue from opening bursæ when they have been in a quiet state, although this practice may be sometimes pursued without showing any ill results. When large and very much thickened, I have removed them, but in doing this have nearly lost a patient, and I have seen another actually die from this operation. In the case under my care, erysipelas took place, the inflammation extended to the fascia of the thigh, which sloughed, and this placed the patient in the utmost danger. Where the loss of life may be so imminent, I conceive that no judicious surgeon would urge an operation for a complaint that may be carried through life without much annoyance. These bursæ are structures of low organisation, and are so intimately connected with the fascia, that any injury of the one will lead to the inflammation of the other structure. I do not know of any advantages that can accrue from the removal of these bursæ that can be placed in competition with the serious event that may be the consequence of the operation.

There is another case of inflammation and thickening of that bursa which is placed between the ligament of the patella and the head of the tibia, which may also be called the housemaid's knee, as it arises from kneeling. This case is accompanied by much pain, and is more difficult to set to rights than that which forms upon the patella. The bursa between the semimembranosus and the tibia now and then presents itself enlarged. I have usually found that persons who take long walks are those who are liable to it. Of course rest is, in all of them, indispensable in the treatment.

Although the prevalence of scrofula is so great, and the opportunities of observing the phenomena of the disease are so numerous, yet we have no succinct exposition of the conditions under which it exists, or of the laws which regulate its progress; it can hardly be said to have any laws assigned to its manifestations; and, indeed, it is sometimes difficult to define in all cases what is scrofula and what is not. It can hardly be disputed that the essential character of its existence is that of an innate condition of the constitution. But we are not to infer from this peculiarity in the constitution, that the scrofulous manifestations will necessarily be made apparent, or that the individual may not pass through life without showing the least sign of the nature of his constitution. The evidence of the state may often depend upon contingencies, which we know to be not unfrequently the case. The absence of manifestation by no means proves that the individual has not the principle of scrofula implanted in his constitution.

A material point of the inquiry into the natural history of scrofula, must be that of estimating the influence of its manifestations on the system. I think the prosecution of such an inquiry will not lead to the conclusion, that this complaint so far encroaches upon the powers that sustain life as intrinsically to be fatal. We frequently see persons who, when young, had suffered from scrofulous affections, and who, having passed over the impressions the complaint had made, have afterwards enjoyed a fair share of health, and lived in comfort to a good old age. The fact is, that great manifestations of the scrofulous constitution may go on, and yet the ordinary processes of health be little disturbed, the powers but little impaired, and the functions of life very little interfered with. As the local affections are found in such a variety of situations, we are not aware that the mere disease, when seated in parts not essential to the maintenance of the vital functions, ever is destructive to the actual existence of life; or at least it must go on to derange the structures on which it is implanted to such a degree, that from any other cause the same series of affections would place the constitution, by the great disturbance they create, in imminent peril. Tubercles, if not in such number or degree as seriously to interfere with the functions of the lungs, do not necessarily endanger life; and we find that scrofulous disease of joints does not influence the system so injuriously as to derange the functions of life, until it has proceeded so far as to destroy the essential structures of the part.

It is a fact of daily observation, that the local affections of scrofula do comparatively little affect the general system of the animal functions. I continually see cases in which a joint is diseased, to a degree which in other kinds of complaint would be regarded as of a most fearful extent, where the patient has a tranquil and firm pulse, good tongue, sleeping well and enjoying his meals; and these patients, with good air and proper nourishment, will, in due course, get all the local mischief healed, and become healthy persons, although the course of the complaint may leave some impairment upon the structure, so as to limit the motions, if it has attacked a joint. We may reasonably infer from this fact, that however active and energetic the scrofulous constitution may be in manifesting its local symptoms, yet with all this, it is a state which seems to associate itself and its manifestations with the common functions of the whole system, leaving all the processes of life little impaired, notwithstanding the peculiarity of the constitution.

Scrofula cannot be set down, in reference to its manifestations, as a persisting disease. We see persons of advanced age who have had scrofula in their youth, and are then quite free of any appearance of its existence; and I believe we never see the local disease going on in very old patients. It is a state that unfolds its character in early life, and languishes as the period of existence declines. If this view of the subject be correct, the surgeon has the greatest responsibility thrown upon him in the management of scrofulous complaints, by having recourse to operations on account of them, which should only be resorted to when the life of the patient is in danger.

It has been asserted, and the opinion seems to have obtained some influence over the minds of practitioners, that scrofula is a mere state of weakness of constitution; but if we are to measure weakness by the want of energy of the mental powers, by the languid state of the circulation, or the absence of muscular strength, or by the weak powers of the stomach, and therefore deficiency in the means of receiving nourishment in the individual, we do not find that in any of these conditions the scrofulous subject is in a state inferior to a large class of individuals who are set down as being healthy. We do not find that the pulse varies in any degree proportionate with the local scrofulous disturbance, nor does the mischief going on in the parts disclose any influence over the natural functions of the body, that necessarily proves that weakness is a feature to be delineated in the portrait of scrofula.

There is a condition under which scrofula exists, that must have attracted the notice of observers, and which is of the utmost importance in its practical bearing, as it affords a valuable principle in the treatment of the complaint. I allude to the tendency which there is in scrofula of varying its local manifestations. And this change from one spot to another will even take place several times before any alteration of the structure takes place in a particular part. It would almost appear to be fugitive in its attacks before it settled down to one part.

Some years ago I attended a young gentleman who had a scrofulous affection of the knee; by rest, and the usual attention which these cases require, it evidently soon improved; and then the knee, almost suddenly, appeared to be well. He now felt pain in one of the lumbar vertebræ, which was aggravated upon pressure. This local affection was treated as for disease of the vertebræ, by which he was greatly relieved, and very soon all pain and fulness about the part had left. The knee now again became enlarged and painful, and from the lingering way in which it continued to go on, the local manifestation seemed settled in this joint. I had an infant of about two years of age under my care, who had an unequivocal scrofulous affection of the knee. One day on my visit, I found the swelling of the joint quite removed; but the mother stated to me that the child did not seem so well as it had done, and drooped its head. Not many hours passed before it was evident that the child was labouring under hydrocephalus. The care of the patient was transferred from the surgeon to the physician, and in a short time the patient died of hydrocephalus. I had in the hospital a youth of about twelve years of age, who had from infancy a purulent discharge from the meatus of one ear; this would stop, and then he had an attack of strumous ophthalmia; after some continuance this disappeared, and then some of the absorbent glands in the neck became enlarged and inflamed; this affection also had its period, and then an impetigenous eruption would appear on the scalp. Each of these local affections, which may all be placed in the class of scrofulous disease, would abide a limited time, although not exactly in the order I have placed them, and afterwards recede, another local expression making its appearance, and proving that the activity of scrofulous manifestations was not subdued, and that if the state of disease did not permanently fix its locality, yet it preserved its active energies to infringe on the natural state of healthy structures. These cases appear to me to prove, that it is one of the laws of scrofula to be changeable in the parts it fixes upon as the seat of its local expression, and that it will have scope to exercise its energies.

If the local affection has so far advanced as to produce an absolute alteration in the structure, it then seems as if it had scope enough for its excited energies, and becomes stationary until its course is run out. And as all the processes of life are not infringed upon by this superadded derangement, and it, as it were, exists under an associated arrangement with all the natural functions, so it is well for the patient if this local manifestation does not attack parts that are essential to existence. When the excitability of the complaint has been roused into action, it will display its character until it is subdued, either by the change which years may cause in the constitution, or by the fulfilment of that period which limits its power, a period which it is not unreasonable to attribute to it. We find that if the constitution be relieved from one local affection by an operation, or the erroneous interference of surgery, this effort to go into action will quickly seize upon another seat to exercise its persisting power. In the practice of surgery, we so very commonly find that the patient who has a scrofulous joint has a tendency to pulmonic disease, and that a circumstance of but slight character may aggravate this complaint to a perilous state; so that the act of removing one already established manifestation will transfer the attack, when the part is taken off, to the lungs. Where I have had the opportunity of watching patients who have had scrofulous joints removed, they have for the most part lost their lives by phthisis. I have no hesitation in saying that the removal of scrofulous limbs, when the patient has appetite and sleeps well, is far from maintaining the scientific character of the profession. I have been impressed with the greatest regret at so often being unable to persuade mothers who have consulted me for inflamed cervical glands in the persons of their daughters, that if an evil is to be attached to them in some form of this complaint, they should be contented that a daughter may be preserved to them at the expense of some disfigurement in the neck of the young lady. And I regard it as a fact, that by the complaint fixing in these parts there is a reasonable assurance that the lungs may continue free from disease. It has happened to me to know a family of young ladies, where one, in whom the glands of the neck suppurated, remained afterwards in good health, whilst the sister (who was free from this symptom) died of phthisis.

As the absorbent glands, particularly those of the neck, seem to be when inflamed the safeguard of the lungs, so I believe this sanatory influence is more apparent when they are in an active than in an indolent state. It must be a common observation that there is very great variety in the degree of activity with which the suppurative process advances in these glands; and probably the lungs are under less security when the glands are slightly inflamed than when the peculiar scrofulous influence is active and energetic. Indeed, it is consonant to what has been before noticed, that the mutability of its seat is most common when its local manifestations encroach but slightly on the natural structures of the parts in which it fixes.

As we assume that all scrofulous complaints are but an expression of that state of constitution which we understand by the term scrofula, so it must of course be true that the condition of scrofula being supposed to exist, the manifestations of this state may be brought out by contingent circumstances, as well as by spontaneous evolution. Thus I have had in the hospital many cases of slight injury in the hands, feet, and legs in young persons, which, instead of going steadily through with the reparative process, have, after a week or two, put on all the features of a perfect scrofulous affection, and then lingered for very long periods with all the specific character of this disease.

It appears to be a law in pathology, that when injuries, instead of exciting the processes of reparation, are disposed to go into a disease of another character, that the probability of this change in the local symptoms will take place is inversely as the severity of the injury. When this is considerable, the energies for carrying on the processes of health are more strenuously called forth, and the powers better sustained for completing the restoration. But hurts of a slight kind not calling forth any remarkable degree of healthy action, leave the structure open to the scrofulous influence, without the power of checking the establishment of local mischief.

The influence of wet and cold on the surface of the body may be reasonably assumed as a cause for exciting the scrofulous habit to put forth its local manifestations; as we well know to be the truth in some cases. I am convinced of the salutary effect of sea-air upon scrofulous diseases. I think it will be allowed that there is a striking difference in the ordinary effects of this air over that of inland places, as I know the careless exposure to it does not bring the train of complaints which are included in what are called colds. I attribute the great benefit which the sea-side produces in cases of scrofula to the saline particles with which the atmosphere is charged, and with which the surface must be continually in contact; producing a healthy stimulus to the body: at all events, the influence of the sea-air over scrofulous complaints is most unequivocal. We find, also, that slight hurts, such as bruises and excoriations, will heal much more readily at the sea-side than elsewhere. It must, however, be borne in mind that one summer's residence at the sea does not often prove the value of the remedy; and that it may be requisite to pass two or three seasons in this manner before the patient derives permanent benefit. The influence of sea-water has also a striking effect; by altering and improving the condition of the surface of the body, it adds vigour to the circulation of the skin, and renders it more than usually sleek.

I must not omit the hard brush as a very useful auxiliary in the adoption of means for relieving scrofulous complaints, as it is a remedy well calculated to keep up a healthy state of the surface of the body. The surgeon, in inspecting, as he is called to do, patients in all classes of society, cannot fail to observe the advantage the hard working poor, when not worn down by sickness, have over the rich: we find their skin, when clean, smooth, and healthy. When we view the various circumstances arising out of the state of the atmosphere injurious to health, and see a large class of mankind, such as labourers in the fields, soldiers, and sailors, who often carry on their occupations exposed to all the variations of the weather; and compare this scene with the great care the well-clad and luxurious take, to guard against the slightest catarrhal complaint, we must feel that if the positive nature of the classes do not differ, there must be some counteracting causes to protect the lower orders. It is in this very labour that they possess a safeguard for the protection of their health; for the great friction of the skin which the clothes of workmen produce on the surface of the body insures to them the power of resisting many of the deleterious influences of cold and wet. The hard-working man, if he avoids irregularities in living, may, with all his privations, enjoy a good share of health and long life. I think the use of the brush is very contributory to the preservation of health, and that it has a singular efficacy when employed in scrofula.

The scrofulous affection which indicates most decidedly the limitations under which the manifestations of the complaint exist, is the enlargement of the tonsils. These cases are more common in the female than in the other sex, and are rarely found after thirty years of age of any troublesóme size, however large and embarrassing they may have been at more early periods, particularly in that of childhood. I have seen very many exceedingly enlarged tonsils producing the greatest annoyance in patients at fifteen or twenty years of age, which have gradually shrunk or assumed the natural size by the time that the subject had arrived at the age of thirty. If we consider the great utility of these glands in secreting a mucus of a peculiarly lubricating kind, so valuable in the economy of deglutition, I cannot regard it as good practice to remove these parts so unsparingly as I have known to be often done.

There appears to me great caution always required in the management of absorbent glands when inflamed or in a state of irritation; but this discretion is still more necessary to be observed when the affection is a manifestation of scrofula, although a remarkable difference exists between the scrofulous affection and the inflamed state of glands from other sources of excitement. The absorbent glands inflamed from ordinary causes have, except in very robust persons, a most depressing effect upon the powers of the constitution; whereas the scrofulous attack seems to call forth no sympathetic and lowering state. But they sympathise most readily with the slightest irritation of the surface in their neighbourhood. If any thing more particularly can excite absorbent glands, it is irritation of the skin. The surgeon does not find in his operations, where the integument is fairly cut through, that the absorbent glands are irritated; but he knows full well how much and how readily they are irritated by a slight abrasion of the cuticle. Cases are continually presented to him of this truth from friction about the foot. Therefore no irritating application should be applied to the parts over an inflamed gland; and if such substances are ever justifiable, they are only to be tolerated when the part is perfectly free of tenderness, and decidedly indolent; mere friction is equally objectionable. The application of leeches to inflamed glands is so generally accepted as a point of practice that they are never omitted as a reputed remedy. I have two objections to them: the one is, that if the bites inflame in the slightest degree, these irritated points will most surely add to the inflammation of the gland. The other objection is, that they are apt to deceive the practitioner, and cause a great misapprehension of the progress of the complaint to the patient. They really interfere with the course which unobstructed nature was pursuing, and probably place the case in a more unfavourable condition than if undisturbed it would have taken. I think I may say that I have hardly ever seen a case of inflamed gland where suppuration did not ultimately take place after leeches had been applied. They relieve the pain and, perhaps, the swelling for a few days, when both the surgeon and the patient rejoice in this apparent benefit, which it is concluded has been produced by them; but in a very short time the progress of the case shows that it is pertinaciously advancing to suppuration. The fact is, the leeches serve to lower the intensity of the action, and to slacken the progress the case is making; but they have no power to stop the work of nature. When the efforts of living parts have been roused to fulfil well and speedily the perfection of a process, it must probably be injurious to the success of the case to have such useful activity checked or disturbed, and thus cause the further stages to progress only with languor.

The local treatment of glands when inflamed should be most carefully to avoid every thing that can irritate the surface. The soothing influence of warm water is most likely to prevent the establishment of the suppurative stage, and nothing but soothing means are required. I have before alluded to the fact that inflammation of scrofulous glands does not seem to make the great impression on the general health that other similar affections do. This is probably on account of the scrofulous manifestations being associated with the functions of life, of which association we have strong evidence in the existence of serious scrofulous diseases of joints going on whilst the patients are in a reasonable state of health.

The affection of the cornea, usually understood by the term strumous ophthalmia, is also a complaint very limited in the periods of its appearance, as it is, perhaps, never seen as a first attack, except in quite early life. The difficulty, amounting commonly to an impossibility of getting a sight of the cornea in children of three or four years old, must give some value to any means of effecting the object without the embarrassing trials of using force. I have invariably found that a short and mild course of mercurial medicines will accomplish this. I find by giving children three or four grains of hydrarg. cum cretâ twice a day, that those, to whom light is most intolerable, will, in less than a fortnight, be able to bear it well, and allow a free inspection of the eye.

The scrofulous affection of the mamma is rare; its peculiarity, is, that, if it has advanced far, an opening forms from the surface to the interior of the gland, and which is of course difficult to heal. This disease is also very rare in the testis; I have generally seen it only in quite young subjects. The same circumstance occurs here also, as in the breast; an opening forms, penetrating to the glandular part of the body, and through which the seminal fluid will exude. A stage of this disease is that where the glandular parts appear devoid of all investments in a state of ulceration, which has been regarded as a fungus, and has been sliced off to bring it down to the level of the surrounding parts, supposing that this would facilitate the healing; but in advising this practice it was overlooked that the difficulty arises from the quality of the parts, the one being in a healthy, and the other in a diseased state, and therefore incapable of entering into the necessary associated actions. This state of disease, whether the fungus be removed or not, is followed by the wasting of the glandular structure of the organ.

In seeking some of the conditions, which the series of local affections of scrofula seem to point out, I have insisted that one of these is the liability to change of seat; and it may well be suggested by an inquirer, whether this change of locality may be effected by artificial means, and the local disease be removed from one affected part to another of less importance. An investigation that could lead to an affirmative result on this point must be of interest to the surgeon. We have instances of the translation from a greater to a less state of disease in some of the joints, particularly in the hip. In the management of these cases we often find that after a slow progress of improvement the joint will more rapidly advance than before, and we then find that a formation of matter has commenced just below it, usually on the outer side of the thigh, but sometimes on the inner part near the adductor muscles. And as this formation becomes fairly developed the joint appears quite relieved, no pain nor tenderness remains, and the limb can be freely moved in every direction. This relief of the joint by translation most commonly occurs in very young children. This is, indeed, a manifestation of the scrofulous condition of the constitution ; but it is so far a better state of things, as it is a change from a more important to a less evil. The same change of the seat of the affection takes place in the psoas abscess. We always find those symptoms precede this formation, which indicate disease of those vertebræ to which the psoas muscle is attached. When the patient says that he has had lumbago previously, great feeling of weakness in the loins, and indisposition to move about, upon the formation of the matter all these sensations are relieved, if they do not entirely cease. The abscess is a derivation from the disease of the bones which had been taking place, and which is now converted in a new form to another situation. This is so far an improved change, that if the abscess can be saved from a permanent opening, the patient will get well with less serious injury to structures than if the disease had gone on continuously in the bones. This view, of course, is on the understanding that the matter becomes absorbed, and that the abscess does not lead to a state perilous to the constitution.

It appears then to be the case that scrofulous affections may not only be converted from a milder form to one more serious, but that the change may take place in the reverse direction. But it is also well known, that the active exercise of some extraordinary, although natural function, will suspend the disease for a certain time. That in the female sex the process of gestation will suspend the progress of phthisis is acknowledged ; and it is not at all unusual to find the disease altogether kept in abeyance during those years that childbearing is going on, while at the close of this period it bursts forth with increased activity, often speedily producing a fatal termination. A man labouring under disease of the lungs was brought to the hospital on account of a wound of the brachial artery in venæsection. I secured the artery, but the quantity of effused blood had so distended the part that a large cavity was formed, and of course considerable suppuration ensued. The wound did exceedingly well, so that in about three or four weeks it was quite healed. During the time the wound was discharging he had no pain in the chest, no expectoration, nor any cough; but as soon as the wound was nearly closed, the cough returned. He then left the hospital, and I heard afterwards that he died in a month, the disease of the lungs having rapidly carried him off. In about a twelvemonth afterwards I had another case precisely similar in all respects, and where the patient also died in about a month after the wound in the arm got well. When the energies of the conservative principle are fully called into exercise for the reparation of great injuries, other diseased organs are left quiescent in their progress, or they are altogether relieved of the diseased state. The conservative influence which excites the healthy actions ordained for restoring injured parts can impart to adjacent structures a disposition, as it were, to convert a disease into health; and it is thus even scrofulous affections may be controlled and cured. We have, in physiology, a state of actions which may be taken as analogous. We find that those organs that pursue an unbroken course of appointed actions are but seldom the seat of disease, as is the case with the lachrymal and salivary glands, which are always pouring out their necessary fluids. The energies of healthy actions when fully sustained, are opposed to the encroachments of disease.

One considerable part of the practice of surgery is that of employing, and properly adapting the several alterative applications we may have the command of. If we have to treat a sore that is irritable, painful on pressure, and discharging not pus, but viscid matter, forming a mask over the surface of the living structure, we know that healthy granulations are not underneath; that there is a perverted instead of a natural action going on in the part, and which art ought to be able to change. We apply that useful alterative, the nitrico-oxyde of mercury, and almost in a few hours this will have changed the sore so far that it now secretes healthy pus, and can easily bear a gentle pressure without bringing on any irritation; we have indeed in this effect the best evidence of the value of an alterative application. We have overcome the deranged action by instituting a healthy one, and the change thus produced is permanent.

But it is not only on the part itself that the influence of an alterative remedy may be exerted, for we know that, by means of those sympathies or associations that exist between distant parts, we can act favourably on a diseased part, by means of exciting an action in another place, with which there is a sympathy. I have already alluded to a species of irritable sore on the glans penis that will disappear after passing a bougie. It is admitted by the constant course of practice that by means of the associations between the surface and the deep parts, the latter are to be beneficially acted upon. Even the benefit of a few leeches to the surface over a deep-seated inflammation must be something more than the mere abstraction of the small quantity of blood from the inflamed part, the vessels of which most likely come from totally different trunks. It is not only to the vascular system, but to the sympathetic associations, that we must refer the changes that are produced in the distant part. The power which artificial actions instituted in one part can exert over other parts in a state of disease, is not only to moderate the activity, but actually to change the form from depraved to healthy action, and to excite them to commence the process of reparation.

Whatever term may be adopted for noting the quality of counter-irritants, the power they possess is that of changing the disease in some neighbouring part, to that series of actions which we call the reparative process. To effect this purpose there are certain conditions under which they should exist, and of course there are degrees in the powers by which they are to act. Practitioners have not, as far as I understand, settled in their minds what these conditions are, inasmuch as I find that there is a great difference in their preferences. Some think that irritating the skin is the best; another is partial to blisters; and then those who prefer issues think that the efficacy is in proportion to the quantity of matter that is secreted, or some think a seton has the preference because the instrument used can be plunged deeper into the structure, and fight the battle with the disease hand to hand.

The real intention of the best counter-irritant is, that it should inflict an injury for the purpose of raising up those processes which are truly reparative and healthy, and which are not to be excited tamely and languidly, but in a way to be carried on vigorously and with unabated activity, by which this injury, purposely inflicted, establishes an adventitious healthy action, which by association has the power of superseding the diseased action. It is in the issue made by means of fused potass that we have the most effective conditions for fulfilling the intentions of a perfect counter-irritant. The very instant it is made the energies of the structures are called into an active state for commencing and carrying on the processes, first, of throwing off the dead part, and then of repairing the breach; thus establishing a series of healthy and vigorous actions well calculated to subdue the prevailing influence of disease in the neighbouring part. But in order to afford all the advantages that issues are capable of producing, they must be kept in a vigorous and active state, and even often repeated if there is the least disposition to their declining into indolence. The notions which surgeons have of issues seem to be unsettled and imperfect, and therefore they have not allowed themselves the opportunity of estimating all the value they possess. It has been thought enough to make an issue, and let it take its course for a certain number of weeks, and then be satisfied that this remedy has had a fair trial, and can do no more. It is in the intensity and the undeviating continuance of healthy action that its full benefit must be sought. One of the worst attacks upon the character of issues was a suggestion made some years ago, of using glass beads instead of a pea. This contrivance must have the effect of causing the issue to become very readily indolent.

I think the issue made by means of some destructive agent better than that by incision, as a more elaborate train of healthy actions is called into operation to engage the powers of the parts in the processes of reparation. Some surgeons have adopted moxas, but they seem to me to have less influence in obtaining the chief object of the counter-irritant: they are more tedious and more painful in making; but they look like a more elaborate exhibition, which may engage some minds in admiration of them. Blistering does not carry out the purpose so fully, of implanting a continued series of healthy actions; and are, to many irritable skins, very annoying, particularly if they are kept open by irritating applications, procuring to the patient sleepless nights, by which the regular state of health is made to suffer materially; whereas the issue, when once made, produces no pain nor more than the slightest inconvenience, carrying on, in tranquillity and unobtrusiveness, its constant beneficial influence. Those applications which irritate the surface are, perhaps, inferior to blisters, as they call forth in a less degree the exertion of healthy actions. I consider the seton inferior to the issue, and where it is really beneficial, it appears only to be so when it is cutting its way out. The utility of issues really depends upon the circumstance of their inducing the living powers to relieve structures from deranged actions, and to restore and make perfect natural functions. In the caustic issue, all the requirements for such an exercise of necessary processes is obtained: the moment the destruction is effected, the healthful actions are brought into operation, and patients have often informed me that the pain in the diseased part has improved from this point of time. When the slough is thrown off, then that process which is described as the granulating stage is still carrying on its healthful influence on the disease; and even when the ultimate state of cicatrization is concluding the adventitious energies, I have been enabled to distinguish the unabated beneficial influence. There is a quality even in the pea or bean that is subservient to the utility of issues: they are deposited in the place once a day dry, and of course do not fill the cavity which the moist one, now removed, has left, and therefore for some hours there is an energy in the parts of the issue to close in upon the body; and afterwards, as the pea swells, there is then an energy acting to increase the slightly contracted size of the cavity.

Thus there is kept up as it were an oscillation of varying energies, all useful for the design with which the remedy is employed; and this beneficial effect, the employment of such things as glass beads cannot produce.

As the efficacy of the remedy arises so much from the active state of it, if I find an issue indolent, I at once make another, and this perhaps is often repeated: I find that they frequently lose their lively state in a month or six weeks, and this may require that the issue should be renewed. I never find that patients who have once had an issue, and experienced the benefit of it, object to submit to have others made. To know the full value of issues in cases requiring them, this care to keep up effective ones must be invariably followed. The issue is indeed a most effective remedy in diseases of all kinds in the joints, in diseases of the vertebræ and of the long bones, and even in diseases of the periosteum, or fascia; in short, in all diseases of deep parts it is available. But it must be borne in mind, that, if the issue becomes irritable, it is no longer of any use; a circumstance which proves the position I have laid down,—that it is in the exercise of healthy actions that we are to calculate upon the benefits arising from them in disease.

In the wards of a large hospital there are always to be found numerous cases of diseases of joints, and the greater proportion of them is of the knee. In the scrofulous disease of this joint where the bones alone are affected, the enlargement is principally about the femoral portion of the joint, and the articulating surfaces being smooth and having no tenderness, freely move on each other, and a certain limited amount of motion is allowed without pain or the sensation of stiffness. The structural changes may even go on to the formation of abscesses, and to the destruction of portions of the bones, yet the joint may be moved with freedom and without exciting pain. Amidst all these local derangements, the ordinary vital functions may be undisturbed, the patient's general health may continue good, and he may eat and sleep as well as others in health. If the local complaint be treated by employing issues, with the advantage of sea-air, the energies of the scrofulous disposition will often wear out, and the patient may generally recover with a very useful limb.

The hospital produces numerous specimens of that order of cases in which disease begins in the synovial membrane, particularly of the knee joint. It is of the utmost importance to the welfare of the patient, that surgeons should be fully acquainted with the earliest symptoms in the commencement of this complaint, that they may recognise the very first attack, by understanding which, they may save the sufferer from all the annoyances of permanent lameness; for in treating these cases in the incipient stage, there will be a fair chance of effecting a perfect recovery. The features by which this affection is portrayed, are happily precise and well defined. This complaint is usually described as causing some appearance of swelling about the joint, owing to increase of the synovial fluid, but I think this rarely occurs; although as the complaint advances the soft parts become thickened around the joint. At the commencement, motion does not give absolute pain, but it excites inclination in the patient for reposing the limb when opportunity offers: it also produces in him the feeling of a slight stiffness; but what is in particular the most annoying to him, is the fidgetiveness, and even slight pain in the limb, on first going to bed. This never fails to be the case, and increases in degree in proportion as the affection slowly advances. On a slight increase in the progress of the case, the joint gives some pain in moving, which of course goes on increasing to a very great degree, if the patient is allowed to continue to walk. The pain at night is now great, with a difficulty of getting the limb into any thing like an easy position. We find it to be the case, with few exceptions, that any complaint of the lower limb, when it is not so bad but that the patient can walk about, causes the chief suffering when he first lies down in bed, and the night is often passed in wakeful attempts to get ease.

When the complaint continues in this state unrelieved, we find the patient unconsciously availing himself of those appliances which his sensations induce him to adopt for procuring ease, and for which the economy of the limb in its construction has provided. It is when the joints are bent, and the patient steps on the metatarsal part of his foot, that he enjoys the comfort arising from that elasticity which the admirable formation of the limb so well admits. He thus gets every protection for stepping without jarring the affected part, and in the disease of the knee he also escapes some of the effects which would arise from the strong pressure of the bones against each other. By this mode of stepping he escapes much of the suffering which he would have to endure if the limb were kept straight.

The best way of examining a knee to ascertain the state of the disease, is, having the patient in bed, to place the knee in a slightly bent position, to move the patella so as to ascertain that the cartilages are not affected, and then to bend the limb every way, by which any tenderness of the surfaces may be detected. I have already explained why the knee should be bent. The most tender spots are usually over the lateral ligaments. The most unequivocal sign of commencing disease is that sensation which the patella gives when the flat hand is gently pressed upon the lower part of this bone, for discovering which this bone must be loose, which is only the case when the knee is bent. The sensation this pressure gives is more like a crepitation of effused air than any other that I am aware of. It is the result of the altered state of the synovial fluid. It is a sensation quite unlike that arising from loss of cartilage. There is also at this time a greater evolution of heat, which fact is sensible to the hand.

In the very early accession of this complaint, it will often be perfectly relieved by the patient strictly adhering to keep the bed, and by cupping or leeching once or twice.

Although this complaint is usually represented as a state of inflammation, yet it is not strictly so much so as to yield to repetitions of local bleeding, which are usually recommended as long as heat and pain continue, for a period soon arrives in the progress of the complaint when this treatment seems to fail in procuring relief. I have very often noticed the fact, that when, on account of heat and pain, I have bled repeatedly, and although some slight relief has been produced for a few hours, yet the next day the joint has resumed its previous painful state. But on the contrary, on instituting an issue, immediately afterwards the heat has subsided and the pain has very much lessened; thus causing an improvement which has been permanent. The inflamed action necessarily connected with the issue has not added to the inflammation going on previously in the joint, but it has really reduced the diseased action to a tranquil state by the effect of its derivative power. I am convinced that, not only in this early stage, but in all the subsequent ones of more aggravated forms, it is to the free and persisting courses of effective issues that we may hope for curing this complaint. I must advert to one circumstance, which is that, if in making the issue the destructive caustic is so actively used as to produce death of a piece of fascia, the issue will be a painful remedy until the fascia has clearly separated.

Those cases of inflammation of the synovial membrane of the knee which may be referred to a rheumatic affection are well marked by the fact of the sudden occurrence, which usually takes place during the night, the patient finding in the morning his knee very painful and very much enlarged by a rapid secretion from the synovial membrane, which is very tense and painful. In this case local bleeding is very advantageous; and, by the appropriate treatment for rheumatism, the case usually gets quite well. If the inflammation of serous or synovial membranes is so moderate as only to secrete their proper fluid, the derangement rarely goes so far as to impair the parts seriously. There is also a frequent case where the membrane is largely distended by synovia, which is owing to the presence of an adventitious cartilage or body in the joint; this, although it may be lodged in a steady position, will, on using the joint much, excite the membrane to secrete largely. A strain of the ligaments of the joints will also sometimes lead to a large accumulation in the cavity of a joint.

If the pain on moving this joint has not been great, and the advance of the complaint has been slow, there will be swelling arising from thickening of the soft parts about it. In this stage the adoption of issues is still, if possible, more called upon, as local bleeding has no influence in acting upon this condition of parts. It is necessary to make one observation on this occasion, which is, that these issues should be successively planted around the joint, as the sphere of the influence of any one does not seem to radiate to the whole extent of the altered parts. The mere thickening is probably not a part of the diseased state of the membrane, but a useful provision for preserving this part from the injury which freedom of motion may impart;

and thus be a means for securing to the joint less of the disturbance arising from freedom of action and from pressure of its parts, by circumscribing the extent of its motion.

As the synovial disease advances, or indeed sometimes at an early period, the invasion of the cartilaginous surfaces may take place. As this change more commonly occurs in the trochlea in which the patella is lodged, it is generally detected on moving this bone over that surface, at the same time bending the knee considerably; the sensation which this loss of cartilage gives, is quite that of a rough surface, and different from the crepitation of altered synovia. If this state of cartilage be present, a very distressing symptom attacks the limb at night, which is an irresistible jarring of the bones, giving at the same time great pain. It has been proposed to prevent this occurrence of the painful concussion by encasing the limb in a resisting apparatus. I have tried this expedient, but always found that the patients suffered more on the application of it than they did without it. The muscles which the disease has excited to produce these irritable actions appear as if they were impatient under the restraint that is opposed to them. In this condition of things, more relief may often be procured by keeping the knee quite in a bent form on the side, in which position the parts of the joint are left most loose, and therefore press least on each other. In this state of the joint, the plan of keeping up the influence of issues in the most active way, is the only one that can suspend the course of disease, and give a chance of restoring the limb.

I have rarely seen the synovial disease run on to a destructive result where the case has been treated by means of active issues. I believe it will be found that in those cases that have been set down as anchylosis of the knee joint, the real seat of the junction has been between the patella and the part of the femur in which it is lodged, the trochlea between the condyles. In this way the extensor muscles of the leg are left unable to extend the limb, and so far the joint is locked. But nevertheless the leg remains bent to a certain degree, by which the limb comes to the ground softly, and is thus saved from the injury of jars.

I once saw an adventitious cartilage removed from the knee-joint of a fine young woman, and the result of the operation was, that she died in less than a week from violent inflammation of the synovial membrane. Such an event, implying the fearful chance of sudden death, must make a surgeon, who feels his deep responsibility, pause before he can recommend an operation for this purpose; particularly as the evil may be made very tolerable by bandages and contrivances, and so continue of less magnitude than many of the calamities which cannot be shaken off, and under which life is often passed with cheerfulness. I have observed that if this operation has been successful after the healing of the wound, there has then remained a considerable limitation in the free motion of the joint; and the same circumstance has likewise taken place in those cases which have got well after the joint has been accidently punctured. From this observation I am led to suppose that in all successful cases of this kind, that will happen which we know takes place in wounds into the cavity of the peritoneum, which is, that adhesions are formed between the edges of the wound in the synovial membrane, and the part upon which it lies, and thus, as in the case of the peritoneum, the inflammation is circumscribed to the mere wound and therefore checked from spreading.

The ankle is a joint not so often the subject of disease as the knee. The early state of this complaint is also evidenced by the impaired motion of the bones, which is best seen when the foot is attempted to be bent to the utmost, as it cannot be made to rise to the same acute angle with the leg as it ought to do. It is stiff and uncomfortable on moving about, and is also very uneasy at night; there is more swelling about it than in the disease of the knee. I think it is disposed to make greater advance in the progress of disease than the other joints, as sinuses leading to the bones are sooner formed. This joint is not so generally relieved from disease as the others; but still the real success must depend on rest and issues.

The joints between the tarsal and carpal bones are frequently affected in the same way as the other joints, and are equally capable of being restored by the same kind of treatment. The diseases of the joints of the fingers are recoverable beyond all expectation; the loss of cartilage can be supplied, and that loose state of the ligaments, which takes place when the cartilages are destroyed, and continues until the articulating surfaces become smooth, will, as the improvement goes on, be changed to the reduced length which is necessary to brace the bones for all the purposes of a perfect ginglymoid joint. These cases, in the success of their recovery, fully display the great advantages of constant quietude and immobility in all affections of joints.

We find the greatest number of cases of disease of the hip-joint occurring in very young children, not but that the affection occasionally presents itself in both sexes, in a more advanced period of the scrofulous era. The attention of the parent of the child is first drawn to the way in which it is observed to limp a little in walking, and it is also noticed that the child is more than usually restless at night. The surgeon at once infers from this limp, that some disturbance is going on either in the knee or hip. The nature of the complaint may be unequivocally determined, by placing the patient on his face, and then comparing the latitude of motion of the femur on both sides, first bringing the thighs as far back as they will each go, and then by rotating each on its axis. On the diseased side the surgeon will find each of these motions limited. There will be pain probably on pressing over the joint in the groin, and also behind the trochanter major. This diminution in the latitude of motion probably arises from some thickening set up for the purpose of protecting the synovial membrane, as we see that at the same time there is a wasting of the muscles that immediately surround the joint, which is another provision for keeping the joint as free as possible from the irritation of motion, by which the disease may possibly be prevented from advancing so fast as it otherwise might do. When the proper treatment is early adopted, the patient will often quite recover, and have the full and perfect use of the joint. And, further, there is occasionally a translation, by which the pain and stiffness quite leave the joint, and an abscess makes its appearance in some of the neighbouring structures, which event is a real derivation of the complaint. If the disease advances so far that a destructive process commences in the essential structures of the joint, then the ligaments become so far altered that the head of the femur will be displaced from its natural position, and the limb will also assume the appearance which is seen on the ordinary dislocation of the femur when the head is on the ilium, the thigh of the diseased side will cross the other, and the toes be turned to the tarsus of the other foot. Before or at least whilst this change is going on, the pain and general irritation increase; but after the displacement has taken place, then both the pain diminishes, and the general state of the constitution becomes comparatively quiet; and in the usual farther course of these complaints the patient recovers, with this sort of dislocation remaining through life. This displacement is, indeed, an improved state of things as to the effects of the disease, and calculated to give ease to the patient, inasmuch as, instead of two diseased parts being in a situation to press and rub on each other, the acetabulum is now relieved of all pressure, and the diseased head of the femur is now made to repose in a bed of healthy structure. Thus the parts of the joint are placed in the best condition for allowing the powers of reparation to go on, and consequently for bringing the whole system into a state of tranquillity. We daily see individuals who have escaped the more destructive consequences of this disease, and who move about on irons, fully capable of enjoying exercise.

It seems surprising that some surgeons should have shown great anxiety, and taxed their ingenuity to find means of retaining the head of the bone in the acetabulum, when the disease of the hip has advanced to this point; thus inflicting great suffering by forcing two diseased surfaces in collision with each other.

In the hip disease much has been said respecting the shortening of the limb. I have repeatedly measured the length of the limb in this disease with the greatest accuracy such a proceeding will admit of, and have not detected this supposed shortening, nor indeed any thing like lengthening, except when the disease is going through those stages which terminate in displacement of the head of the femur, when indeed the limb altogether assumes a new arrangement of position, which excludes almost the possibility of making a measurement. But there is a shortening of the limb not arising from the disease of the joint, although sometimes following it. As when the abscess which relieves the joint, forms in the adjoining parts, and includes in its formation some alteration in the state of the shaft of the femur, so that it becomes carious, and terminates in small exfoliations; in which case I have observed that this bone does not develop its growth in equal increments with the other bones, so that the individual grows up with a shorter thigh-bone on the one side than on the other. The same course of events I have often seen in the humerus, where there has been scrofulous disease in the bone. It has left the arm shorter on the one side than on the other.

In conducting the treatment of this disease of the hip-joint, I have never seen local bleeding do any good, except in the very earliest stage of the complaint, and therefore I at once usually establish an issue which never fails to influence beneficially the complaint. The best place for this application is just between the trochanter major and the tuberosity of the ischium, where it is neither exposed to undue pressure nor disturbed by the action of muscles. Of course perfect rest must be enjoined.

The disease in the shoulder-joint presents all the features and analogies of that of the hip. It is often allowed to go on some time before the patient is aware of the seizure, inasmuch as it may advance to some extent before the pain calls the attention of the individual to the case. The joint has not the weight of the body to support as in the hip, and the arm has only light movements to undergo by which there is comparatively the slightest pressure on the diseased parts ; but, furthermore, the limitation in the motion of the joint, although produced in the same way, and probably for the same sanatory purpose as in other joints, is not readily made apparent, on account of the great capability which the muscles moving the scapula have of compensating for the movements which properly belong to the joint itself.. The first sensation it causes in the joint is a desire to support the arm; and we have in the wasting of the deltoid muscle the same flattening of the prominent part of the shoulder which is so striking in the hip. In the latter case we do not find the adductor muscles of the thigh wasted, and likewise in the disease of the shoulder we discover no alteration in the pectoralis and latissimus dorsi, while those muscles connected with the capsule become thin; thus, as it appears to me, showing a provision for preserving the articulating surfaces from being rubbed on each other. The great necessity for maintaining the limb in a most perfect state of rest is most obvious, by which, and the equally advantageous use of issues, this diseased joint is capable of being restored. I have observed that this affection of the shoulder often occurs at a later epoch in the scrofulous period than that of the hip, or even than the knee.

The occurrence of the disease in the elbow joint is more frequent than that of the shoulder; this also presents itself with the same analogies, particularly as to the early setting up of that process which produces some thickening, by which the limitation of motion is insured. I have found that the part of this joint which is formed by the radius is more frequently the seat of disease than that of the ulna, or when both parts are affected: I have occasionally seen only the ulnar portion diseased. There is also, considerable apparent thickening of this joint, so as to give the semblance of a thick capsule: which is a state we often find in the knee, although not so generally as in the elbow. As this joint has not to bear much pressure, there is not the same degree of pain as in the hip and the knee, and it is not accompanied by the painful nights as in some other joints. I have observed leeching in the affection of this joint to be more efficient than in other joints; but the chief reliance must be placed in issues.

I have been able to trace the diseases of the wrist-joint, and also of the carpal bones, more frequently to some injury of the part, than from the same cause in any other joint, particularly from those moderate accidents which are designated sprains. The same principles of treatment apply to these cases as to the other similar ones. By judicious surgery, I have no doubt that very useful members may be preserved to individuals, which are too often made a sacrifice to operations. It may be assumed as a general principle, that the reasons for removing the joints of the upper extremity are less conclusive than those usually brought forward for a like practice in the lower extremity.

I have already expressed my conviction that the inconsiderate application of bandages is often the source of much mischief, and to explain the cause of this error, I have dwelt upon the reasonable conclusion which we may come to, that when a part is injured, all the energies of the system, of which this part may be one in its economy, should be kept in the freest state, in order that the processes of reparation may be subjected to the least possible impediment. I have often noticed the injurious effect of continuing unnecessarily the bandage around stumps after amputation. As the extremity then becomes œdematous or swollen, and the sore having flabby granulations, of course will be very slow in healing; when, if the bandage be removed, a healthy state of the parts soon follows.

This remark is in reference to the circulation; but the error of unnecessary pressure may be found exemplified in all the structures of a limb, and in none more than in the muscular. I was desired to meet a surgeon upon a case, which was stated to be the result of an accident seven weeks before. The patient, a lady, in walking rather quickly, had felt something give way in her leg; this was followed by very great pain, and it was with difficulty she was got home, although it occurred near her house in the country: the medical man was called immediately, and it was no doubt treated with the strict observance of the proper appliances of bandages and other apparatus, which surgery, as usually taught, enjoins. The examination I gave it inclined me to believe that it had been a rupture of the tendon of the plantaris muscle, as the spot of the injury was higher than the tendo-achilles reaches, the rupture of which the attendant surgeon had conceived it to have been. As there was pain still in the injured part, which was increased on any attempt to put it to the ground, my opinion was required, to decide whether the patient should be still kept under the same restrictive measures. My advice was, to leave the whole free, and trust to the reparative powers, which would best set the parts to rights when the whole limb was left unconstrained. She got about; but still when she moved there was the sensation of a string leading from her heel to the part injured, and the stretching of this produced considerable pain, proving that adhesions had taken place between the ruptured tendon and the surrounding parts. She gradually got better; but in twelve weeks felt a little pain on moving. About the same time I was called to a lady, who, in hastening to get into her carriage on account of some disturbance in the street, felt the sensation of a blow, as if a stone had struck the calf of her leg; she had great pain, and got home quickly, where I saw her. Her description of the sensation of the snap which she felt, and the situation of the part injured, satisfied my mind that the tendon of the plantaris was ruptured, which I explained to her. This led her to deplore the prospect before her, as a female friend had suffered the same accident, who was kept in bed seven weeks, and was as much longer before she could walk. I was so confident of the course the case would take, that I think I might have promised that she should dance at a much earlier time. She was somewhat surprised when I told her I should not employ any bandaging or other incumbrances to the limb. I directed her to keep her bed, to let the limb lie easily on the side, and merely bathe the part with warm water. The soreness and pain of the injured spot every day lessened, and in a fortnight they were almost gone. I then allowed her to sit upon a sofa; in another week all pain had left, and before the month was over she was able to move about as usual. The unfettered way in which the limb was allowed to repose allowed full vigour to the exercise of the reparative powers. It is precisely in the same way I have succeeded in completely and shortly setting to rights a rupture of the tendo-achilles. No contrivance is required to keep the ends of the ruptured parts in apposition. If the limb is left free and easy, the uniting medium will be the sure means of approximating the parts to each other.

I have adduced the circumstance of a wound of the tongue doing very well if let alone, as an instance of the great influence of the conservancy of function in producing the reparation of injured parts. I conceive that no mechanical contrivance can be imagined on rational principles to facilitate the healing of this part when divided, yet the surgeon may most confidently rely, that there is a power beyond what he himself can exercise that will fully accomplish it. This influence which function has over structure is very much in proportion to the organization of parts. Thus the organization of the cutis in the back is by no means so perfect as that of the face and head; and I have observed, that in the very great number of incisions that I have made in the back, either to remove small tumors or otherwise, they have hardly ever united by the immediate adhesive process. But, on the other hand, surgeons know, owing to the greater organization of the face, that, in the operation for hare-lip, if the edges are found not to be united on removing the ligatures, yet, the child being healthy, in a little time the part will begin to heal from the nose downwards, and finally close the wound; the case thus proving to be finally a successful one.

In hospital practice a great variety of wounds of the face are brought under the consideration of surgeons. I have often known both lips completely divided by contused wounds, yet they have perfectly healed, with or without ligatures; if the saliva has passed out at the lower lip, it has only been on the first two or three days. I have seen both eyelids divided quite through with contused wounds, and yet they have completely closed. The cartilage has been divided in the cases to which I allude, particularly in respect of the lower lid; yet when the wound got well, which it did with the least possible help from the administrations of surgery, the tears still had a complete channel formed by the conjoint lids, as well as before the injury. I once saw the lower lid torn in a jagged manner at the inner canthus, and the injury seemed to involve, in its division of parts, the inferior canal as it passes to the sac; yet, when the parts got well, there did not appear to be the least defect in the economy of the lachrymal appendages, and the tears found an uninterrupted course in their way to the lachrymal sac. It must have been often brought to the observation of surgeons that fractures of the nasal bones readily unite; and also, that deformities of the lower jaw produced by injuries undergo changes by which all irregularities are removed; and, by the assistance of some compensating alteration, the imperfection in mastication that otherwise would ensue, has been quite removed. In the changes connected with the teeth, all these advantageous adaptations are continually in progress. In transferring the field of observation of the effects of injuries from the face to the scalp, we shall find that the circumstances will accord with the same views.

The mechanical principles on which many circumstances connected with wounds of the head depend, do not appear to be attended to by surgeons. It does not follow that the impetus with which a blow is inflicted, should be expended upon the part stricken. The head, as a mass, is made up of structures of various mechanical qualities; some are soft, some elastic, and some hard with the least degree of elasticity. And in receiving the percussion, the various structures may receive the effects of the blow independent of each other. We also find a difference of the injury in the same structure, arising out of the difference in the way in which any given momentum striking upon the part, is compounded. Thus, in two blows, the momentum of each may be the same, although the velocity and quantity of matter may differ, if these powers are reciprocal to each other, and then the effects of the impetus may vary very considerably. A velocity may be given to a common hammer that may make the momentum equal to a heavy mass moving slowly. Upon these principles it is that great varieties occur from the impetus with which blows on the head are inflicted. If the mass be small, and the velocity great, it must happen that the bone will be fractured and driven in at the part struck; on the other hand, if the mass be great but slowly moved, the impetus acts in a way that allows it to be diffused over the whole head. And in this way great violence may be done without fracturing the bone; which is usually the state in cases of severe concussion. Or the force may be expended at the base of the skull, producing fracture there, and not at the vertex, the part in which the blow may probably have been given; and it still further often happens, that in the severe injuries of this kind, where there is evidence of so much internal violence having been produced, that there is no mark of injury in the scalp.

A misconception seems to prevail respecting the appearance of the inner table of the skull breaking to a greater extent than the outer. The breadth in which a part stricken will break, must vary in proportion to the velocity of the striking body, and also to the cohesion or stickage of the matter struck, and the breadth will always be, under any circumstances, some slight degree greater than the impinging body. If the fragility of the inner table be really greater than the outer, the former ought to be broken in the least possible degree beyond the outer.

I apprehend it is too readily assumed as a fact, that the inner table is always broken to a far greater extent than the outer; but if it is the case, I conceive the explanation to be this: the two tables having a given, although minute, space between them, the impetus is broken into two distinct applications. The first blow upon the outer table will necessarily break it to a slightly greater space than the instrument which produces it: after this is effected, then the inner table receives the renewed impetus, which is now imparted to it by the outer table, by which this table, allowing it to have the same frangibility, will be broken to a greater extent than that in which the outer was broken.

Amongst the great varieties of wounds of the scalp which occur in hospital practice of the ordinary kind, we find very few that are attended by symptoms of concussion. The fact is, that the impetus of the blow is expended on the mere spot in which the wound of the scalp takes place. We have, in the high state of organization of the scalp, the explanation of the favourable result which usually attends them. It is true that most of these wounds are not large, but then they are contused, and this contusion produces a slight slough of but little appreciable extent, and for the first few days the wounds are painful, and discharge perhaps much; but by means of the highly organized structure this very slight slough is quickly thrown off, and when the part is cleared of it, the granulations become healthy and vigorous, and the wound very soon heals. This is the usual course of those wounds in which the injury is confined to the integument. If the wound and the contusion be deeper and greater than that above described, the structures underneath suffer, as the tendinous expansion of the occipito-frontalis muscle, and then suppuration will almost always follow to some extent under this aponeurosis.

As the collections are formed under the fibrous structure of the aponeurosis, they of course should be very early opened. It is owing to this formation of pus that erysipelas does not so generally supervene in these scalp wounds as might be expected to take place. The structures of relatively inferior organisation will suffer in their vitality, so that we often have sloughs to some extent.

I have seen many cases where the scalp for a great part of the skull has been stripped off, particularly in young children, which have notwithstanding very often done extremely well. I have seen a large portion of the scalp in a child, nearly that of one side of the head, turned back, and yet the whole adhered to the pericranium, and healed, with the slightest exception, by adhesive union. In these cases the scalp is, as it were, torn off, and the delicate tissue between the fibrous structure and the pericranium readily allows its reflection. This sort of wound is really a rent, as a piece of paper may be torn, the edges being in the slightest way contused.

This ready union, besides the very great advantage it offers of speedy union, saves a great annoyance to which such a wound is often subject. If there is a large flap, and no union has taken place either in the edges or otherwise, this part is very apt to coil inwards, and make an awkward contraction of the aponeurosis, and with it of the whole scalp. At a greater age than childhood the detached scalp will sometimes adhere to denuded bone without the intervention of suppuration, but of course the probability is that death of the bone and exfoliation will follow. This probability is increased in proportion to the age of the patient. In children exfoliation will rarely happen; and in adults it will often be not deeper than the external table, and commonly only a thin scale.

There is a circumstance, arising from the way in which an injury is produced on the head, being simply on account of the direction in which the blow is given, which alters altogether the effects that are produced on the brain. To explain this, it must be remembered that the skull makes, in all its sections, some sort of curve; and also that the contents so nearly approach to the quality of fluid, that every impetus impinged on one part will be transmitted through it in the direction in which the blow is given. If every blow was given at right angles to the tangent of any part of these curves, the effects would be transmitted to the base of the brain. But as this is not always the way they are directed, there are great differences in the effects of fractures, and also concussions, on the sensorial powers. If the blow is in such a direction that it would transmit the impulse to the base of the cranium, the cerebral symptoms will be severe; but if the direction of it transmits the impulse across the brain, then they may be very slight. It is this, I conceive, which has caused some little controversy with surgeons, whether blows on the forehead or on the occiput are most dangerous. It is not the part stricken, but the direction in which the blow is given, that gives rise to the difference. *Fig.* 4.

About a twelvemonth ago, a man was brought to my ward who had fallen down the hold of a vessel. On examination, I found that there was a wound through the upper part of the temporal muscle on the right side, with a fracture of the parietal bone above the border of the squamous plate of the temporal bone. A piece that a thumb might cover was positively forced in upon the brain, and the surface of the depressed portion was vertical; so that its pressure was from side to side, and not at all towards the base of the skull. This man, who was middle-aged, had never the least symptom expressive of injury to the cerebrum. The depressed piece ultimately became loose, and was removed.

I had a patient in the hospital, with a tumor in the centre of the forehead. It was evident that it was of a malignant kind, and that it had made its way through the bone. It continued increasing until he died. But, the whole time, he had not the least symptom of affection of the brain, nor paralysis. On examining the head after death, it was found to be a malignant tumor of the dura mater; and, besides projecting outwards through the bone, had also pressed the brain inwards, so as to form quite a hollow for its reception. The whole of the pressure was from before backwards, in a line at right angles to the vertical line. To this I attribute the absence of cerebral symptoms. His death seemed to depend upon exhaustion, as he suffered from nothing like the usual effects of pressure on the brain.

If a blow be made upon the vertex of the skull, whether by the patient falling upon this part, or by the impetus of a moving body, the force may be expended upon, and lost, in the elastic quality of the bones by which a vibration is produced. The effect of this is to cause a serious concussion of the brain. But if the violence is very great, so that it does not expend its force in this way, then the arched form of the parietal bones which form a cupola, and which is preserved compact by the temporal bones, transmits the impetus to the base of the cranium. In this way it is, that fractures at the base of the cranium are produced; and it must be remembered that fractures often occur at the base without the least appearance of contusion or injury to the scalp.

Fractures of the skull form a small part of the injuries of the head; but amongst fractures those of the base make a considerable proportion of those which we have the opportunity of examining after death. But I feel strongly that many of such fractures do recover. I have seen patients do well when there was bleeding from the ears and mouth, and other severe symptoms. A gentleman who was travelling on the back seat of a stage coach stood up whilst the vehicle stopped for an instant; the coach started on fast without his being aware of it, by which he was projected headforemost over the back of the seat, and making a somerset, fell on the vertex of the head: he was stunned, and had bleeding from the nose and ear. He had to endure a long period of pain and extreme sensibility to the impression of light, as it was only slowly that he became better; he ultimately got well, but was left with both the sense of taste and smell very much impaired; which, however, after several years, he recovered.

Fractures at the base seem to begin with symptoms very much like those of bad cases of concussion. But when these first symptoms begin to moderate in a few days, if fracture has been produced, the patient, then, instead of getting tranquil, has the pulse becoming small, unequal, and frequent; and he becomes delirious, having very generally twitches of the face and limbs; indicating another order of things different from mere concussion.

I have no reason to infer, from what I have seen, that a case of fracture of the skull is ever made worse by dividing the scalp over it, where there is not already a wound. I suspect the long-enduring pains that continue after blows, are often cases of that kind of diseased periosteum which I have before spoken of, as cases which are cured by an incision.

I am not clear that any advantage arises from making an opening through the dura mater when there has been, or supposed to have been, blood. I have seen the longitudinal sinus of the dura mater opened; but no evil result followed: by a little pressure on it, it healed as well as the veins of the arm do in phlebotomy.

I am unable to discover the reason of the proposition that has been made, for slicing off protrusion of the brain. The cavity of the skull is fitted for the natural bulk of the brain, and if the bulk of the organ is so enlarged that it presses out at any opening that will allow it to do so, the state which produces this enlargement will not be relieved by diminishing the mass. The rational view of the case is to cure the state, which is in fact hydrocephalic, and the influence of mercury is the means of cure. I believe all the cases in which I ever saw this protrusion happen have been quite young people. A boy was brought to the hospital not long since who had received a blow on the parietal bone, evidently produced by a force acting on the brain laterally: there was apparently a depression, but no wound. The symptoms were mild, and in a few days all pain in the head had passed off. But in about ten days there appeared over the spot where the depression was, a soft tumor which had quickly formed, and this in a day or two pulsated very obviously; as it seemed to increase, I made an opening into it, and out came a small quantity of brain. The tumor subsided, and the wound of the lancet healed. I put him upon mercurial treatment, and all appearance of swelling disappeared, and he soon left the hospital quite well. I have seen instances before of the loss of a little brain, in wounds of the head in children, who have quite recovered without having apparently any function of body or mind impaired.

I have seen what might be regarded as tendency to disease of the brain permanently relieved by a fracture of the skull. A citizen, who fed well, was subject to severe pains and feelings of giddiness, for which he was advised to be cupped, a remedy he often resorted to. At the first introduction of cabs, which were high then, he was proceeding in one at a quick pace, and was canted out, falling on the upper part of his forehead. This produced a large wound and fracture of the frontal bone. He suffered a good deal of pain in the wound, but was not stunned and had no sickness. He had no disturbance of the brain; he did very well, and in the sequel had a slight exfoliation. He had never after this accident any of those symptoms with which he had been before attacked.

It is a rare thing to see those suppurations on the surface of the dura mater, which Mr. Pott has so forcibly described. The most striking case of this sort I have seen was in a patient who had a burn on the head, in which the scalp sloughed down to the bone. The symptoms were such as Mr. Pott has described, and on trefining the part a deposition of matter was discovered.

The cases of concussion which are brought to the hospital are very numerous, and very various in the degrees of the injury. The points I have already alluded to, of the variety of ways in which the impetus of a blow may be communicated to the head, is continually exemplified in these cases. We find that most of these cases present no external mark of the blow, even when severe symptoms are present. Very many of them are so slight as not to require bleeding at any time. The complete evacuation of the bowels, and the daily action of them, with low diet, often include all the necessary treatment, not omitting the especial benefit of mercury when there are any lingering pains. This remedy alone removes the wearing pains and giddiness that will often continue, in spite of bleeding either locally or generally. I think opium should be avoided, and it is quite as well that the mercury, whatever the preparation may be, should act on the bowels, as it then also fulfils the purpose of derivation from the head. It is of the utmost importance that cases of concussion, however slight, should be watched at least ten days or a fortnight; and that the bowels and diet should be rightly managed for a longer time.

The variations under which cases of concussion are presented to the surgeon, may be included in a scale of very wide range. The simplest case may be that, in which a boy gets a slight fall, and, after a moment's hesitation, shakes off the effects, and returns to his amusements; and the extreme case on the opposite side is, when the impression on the elastic cranium is such that the effect of the blow on it is to alter the figure so much as to lacerate the brain. But even in the slight case of the child, if there be the least disposition in the system to hydrocephalus, the blow may be followed by very important results. Therefore this accident, however slight, is always to be regarded as most serious in childhood in its possible consequences.

The violence which produces concussion of the brain may act in the same way as pressure, being transmitted from side to side, and not in a direction to the base of the brain, in which case neither stupor nor sickness may supervene, as I have seen happen in a very severe injury of this sort.

The views which have been taken of the way in which hernia is produced, do not seem to acquit the subject of having been investigated in all its points. We must assume that, in the natural construction of the boundaries of the abdomen, there is provision made for securing the contents from protruding; and it must be regarded as a problem capable of being solved, which shall give the reason why some have hernia and others not, and why the complaint occurs of one kind to one set of persons, and the reverse. It is a received opinion that the female is most liable to femoral hernia, because the pelvis in her sex is wider. I have not observed that this form of hernia is found in women whose pelves are particularly expanded, and many women have the pelves as narrow as any man's; nor have I noticed that when femoral hernia has occurred in the male sex that the form of this part has been larger than usual.

The walls of the abdomen must be considered as a compages of muscular structure, whose action is chiefly employed in keeping up a uniform pressure on the contents of the cavity. But whilst the walls are preserving the cylindrical form of the cavity, the diaphragm is transmitting its powers through the almost semifluid contents of the abdomen. And in the action of this large muscle we possibly may obtain those terms of a problem that shall explain the nature of the formation of hernia.

It can hardly be doubted that before hernia is actually formed in persons advanced in life, and where the complaint slowly comes on, there is some change gradually going on by which the internal ring is gradually made to approximate to the external. The figure of the diaphragm is that of an arched dome, but having a tendinous expansion in the middle, it is divided into two arches of muscular fibres. Now it is clear that if a muscular fibre take a curved form, every point in the curve will act in the direction of the versed sine to that point, or what comes to the same thing, to the perpendicular of the tangent of the point. If the curves of the diaphragm were those of a sphere these perpendiculars would all concentrate in one point; but this not being the case, the perpendiculars will be directed more copiously on some directions than on others; that is, the action of the muscle will be transmitted with greater force to some parts of the boundaries of the abdomen than to others, and thus determine the seat of hernia, If the chest be narrow the direction of the accumulated impulses may fall low, as well as if the distance from the diaphragm to the pelvis be but little, and so an increased impulse may be directed to the femoral ring, accounting for this seat of hernia in females. *Fig.* 6.

The fact of the approximation of the two rings in hernia which are slowly formed, has led me to conceive that the change might take place under the influence of that conservative power which is always acting for the preservation of the economy of parts, and to prevent the impairment of functions. Thus, if the force which the diaphragm is continually exerting be pressing upon that part of the spermatic cord which is lodged in the inguinal canal, by which the structure might be impaired, a process to counteract this injurious change will be begun, and a series of alterations will take place to set this structure free from all pressure, or injurious influence, by which means the cord may be allowed to pass at once from the abdomen to the external parts. At all events it is quite common to find that in most people who have passed the middle period of life, the finger can be passed at once through the external ring into the abdomen, if a hernia is beginning to protrude.

It is by no means uncommon to see an immense bulging above Poupart's ligament. The aponeurosis of the external oblique appears to be extenuated in these cases, and to yield prodigiously so as to put on the appearance of a ventral rupture, the part being powerfully forced out on the patient's coughing. This is clearly the effect of the action of the diaphragm, by which the accumulated forces are directed to this spot. I had a patient in the hospital with an inguinal hernia on one side, and besides this there was on both sides an extraordinary bulging out of the part just above Poupart's ligament, so much so as to look very much like a ventral hernia. I deemed it quite proper that he should have a plate attached to each side of his truss in order to support the aponeurosis. I had afterwards another patient who had no hernia, but a most singular bulging out and thinness of the abdominal parietes at the aponeurotic portion of the external oblique, on which part the diaphragm acted most powerfully on coughing, but the impulse was hardly felt at the rings. A hernia is so very serious a complaint, that every surgeon must be interested in suggestions that may explain the way in which it commences; by knowing which he may afford the means of arresting it in its commencement.

There are circumstances of illness that seem to follow invariably the derangement in position of the abdominal contents; and I believe that an altered arrangement in the position of the intestinal canal in the least degree, is capable of seriously influencing the functions of the bowels, and of course of the stomach. I have seen the condition of these organs very seriously deranged, the bowels being distended with continual flatus, the action of them uncertain, and the patient under general distress of feeling, where there has been only a slight occasional protrusion at the abdominal ring, and all which symptoms were removed at once by wearing a light truss. It seems that any derangement in the appointed condition of position of the bowels, particularly in the freedom of their peristaltic movements, is followed by immediate symptoms that indicate a disturbance of health. There is indeed an influence beyond what might be supposed could happen when we consider the rough treatment they sometimes have to endure, showing that the system is alive to very slight alterations in what may be called the mechanical condition of them, as well as from the greater disturbance of incarceration; and yet in this case when by means of the taxis the protrusion is returned, there follows an almost instant transition to a healthy condition. Much of the symptoms of distress, and of the sudden constitutional disturbance may probably arise from the impediment suddenly produced to the peristaltic action.

The risks of operations are so great that it is desirable to adopt in the best way what is called the taxis. I have seen many cases where the symptoms were severe, in which the manipulator has succeeded. If it is possible to have the warm bath, the taxis should be conducted in it. The advantages attributed to the warm bath are said to be the power of relaxing the parts: if it is meant to refer this influence to the relaxing of what is called the ring of the abdomen, it may be doubted. It does soothe the abdomen generally, and very probably the protruded intestine is affected in a way that a return of the peristaltic action may draw in the bowel. But I think the great use of the warm bath for reducing the hernia is, that the tumor may be handled with comparatively much less pain, by which the abdominal muscles are not excited to act against the efforts which are necessary for pressing the parts inwards. There is, in short, so much less resistance in the muscles on applying the manipulation, that there is by far a greater prospect of succeeding than without the bath. The form in which the body is to be placed to facilitate the taxis, is of much importance. I had a youth with a strangulated inguinal hernia; after trying the taxis, and perhaps some other measures which failed, I resolved to operate. In order to be conveyed to the theatre the beadle carried him in his arms, his head and shoulders resting on one arm, and his hams on the other, so that his body was bent forwards considerably. I was close to him when he was placed in this position, and saw the hernia suddenly slip up. This posture probably offers two advantages: it throws the root of the mesentery farther from the opening, and so allows this structure to draw the bowel inwards; it also brings the passage through which the parts come, whether femoral or inguinal, in a line more directly leading to the cavity. These passages, owing to the oblique position of the pelvis, being at an oblique angle with the axis of the abdomen, are less free and smaller in the straight position of the body than when bent, as they then are made to open directly inwards.

Many cases of strangulated hernia may be got up in the bath, which could not be reduced otherwise without operation; and in any circumstance the incurvated form of the back will facilitate the return of the protrusion.

The different effect of the erect position and the reclining is most marked in this complaint. I believe there are many irreducible herniæ that may be made to return by a long course of lying in bed. I had one case of a patient who had an irreducible hernia for twenty years, which seemed to be omentum adhering to the sac; it completely went up, sac and all, by lying on his back several weeks, and he was enabled to wear a truss, and by this rendered capable of any manual labour. When the patient lies on his back, the powers of restoration are assisted by the slight influence of gravity which is incessantly promoting an unobserved movement to effect the adjustment, and even the ring will, as I think I have found, enlarge itself, on the principle of conservation of the function of the intestinal canal.

There appears to be much to learn in the considerations that call for the operations in hernia. All surgeons have seen patients who have been operated on very early, lost; and others operated on very late, recover. And if we were to take any given number of cases of artificial anus, I have no reason to suppose that the number of fatal cases are in a greater proportion in this state of the parts, than in those operations where there is no opening in the bowel. We have no means of calculating the state of the bowels previous to the inspection by operation. We have no guide to point out the very commencement of peritonitis. We cannot decide clearly of what parts the protrusion is formed. The general understanding in the profession is that the operation should be performed early. The surgeon begins the operation with the uncertainty of what the state of things may turn out to be, and what steps he may be called on to pursue, in order to complete it properly.

The condition of the operation seems to be only perfectly answered when the bowel is so completely returned, that it is freely floating in the abdomen. On this account I have always regarded a mass of omentum in the sac as a circumstance of considerable apprehension. As this state of omentum only occurs in old hernia, where the part has been long protruded, the part within the cavity has become elongated, and does not drag much on the stomach. If it be cut off, and the vessels tied, and then replaced in the abdomen, I have not only seen hæmorrhage take place into the cavity, but I have seen peritonitis apparently set up by the irritation of the ligatures, or else beginning from the cut edges, and spread from thence. Moreover, it has happened, that the divided edges have adhered to the parts in their neighbourhood, and in this way there has been formed, as it were, a belt pressing on the convolutions of intestine under it; so that, if the part that has been protruded should happen to lie under this belt, this pressure, although it may be slight, will entirely prevent the bowel recovering its function; in short, in this way the symptoms of strangulation will be kept up. I am inclined to think the best way is to leave the omentum in the sac; for if the patient should get over the immediate consequences of the operation, it will not cause any harm; and, if the patient choose to lie long enough on his back, and the bulk of it is not large, it may ultimately return into the abdomen.

The power of a gentle influence, acting continuously, cannot be better proved than in the reduction of long-standing irreducible hernia. The adhesion to the sac does not prevent the return of the protrusion, as this membrane will be carried with it. We have, in the cæcal hernia, evidence of what the constant influence of some force, acting imperceptibly, may do by protruding not only a portion of the bowel, but also the structures to which it is connected behind, the peritoneum being only in front. The bowel moves with its own attachments, and appears, as it were, growing to the part where it presents, and therefore it is irreducible by manipulation. I do not recollect that any case that I have seen of cæcal hernia operated upon has recovered; and I believe this may have arisen from the great handling of the parts, in order to push the part into the abdomen, which I have never seen done; and therefore I consider the attempt most objectionable: and when the nature of the case is clear, I think it should be left untouched. I have seen a protrusion of bowel continue some days without very urgent symptoms; but the operation having been resorted to afterwards, there has appeared but little strangulation of the vessels of the part, yet the bowel was found ulcerated at the place of stricture, particularly in femoral hernia, where the bowel turns upon Gimbernat's ligament. It probably happened that a slight adhesion had taken place at the sides of the ulcer, which preserved the integrity of the tube uninjured whilst it remained in position; but on disturbing the part, the adhesion being broken up, the patient was placed in a state of danger.

I have observed that sleep seems one of the most auspicious signs after the operation for hernia. The accession of peritonitis throws over the whole system of functions a very disturbing influence, producing anxiety, and therefore sleeplessness, and giving to the complaint its physiognomy of danger. When peritonitis sets up, it seems invariably persisting; but yet its fatality does not seem to be regulated by its intensity, as we often have death ensuing where the degree of inflammation is by no means great. It has sometimes seemed to me, that in peritonitis of a low degree of action, the membrane may be relieved of this inflammation by merely secreting in a large quantity the usual serous fluid. I have often seen, during an operation, a large quantity of serum pouring out from the abdomen, on which occasions the cases have generally done well, the peritonitis afterwards apparently subsiding into a more healthy function.

I have no reason to think, from my experience, that peritonitis has been removed by bleeding or by blisters: it seems a disease not to be arrested by any other remedy than mercury, to which I feel assured it will yield. I had a female patient in the hospital a few years ago with femoral hernia, on whom I operated: the bowel was sphacelated, and an artificial opening was left; she had peritonitis to a great degree. I put her upon mercury, and on the third day her mouth became affected; the symptoms altogether then changed, and not many hours after quite left her. The wound healed very quickly for such a case, as she was very soon free from the artificial anus. In another more recent case of operation for femoral hernia, the symptoms of peritonitis were severe, although there was no slough of the bowel. I put her upon mercury in an active form, and on the third day the tension and the pain of the abdomen began to subside, almost at the instant that the mouth began to get sore; and she did quite well. These cases are in conformity with the influence of this metal upon serous membranes, and the safety of the patients arose out of their susceptibility to the influence of it. But, in many cases, perhaps, this influence may not be set up in time to avert death, by moderating the peritonitis early enough, which event I have observed happens for the most part about the fifth day. I have, of late, always administered mercury after every operation for hernia. It might be an advantageous step to have recourse to mercury at the earliest moment, and before even the operation may be decided upon, as by this proceeding the inflammation may be kept down to the lowest scale of activity, at the earliest possible period. It might even happen that the difficulty of the return may be so far diminished by preserving the parts from inflammation, that the protrusion may be got up by the ordinary means. If this practice were to be adopted by using the mercurial unction, the stomach and bowels would not be interfered with.

It appears that gonorrhœa, like other diseases which are implanted by the application of infectious matter, runs its peculiar course, and has to go through a regular series of changes; and therefore in proposing a plan of treatment it must be safe to take the assistance of that guide afforded by the observations of the simple course it pursues, when left unaltered by previous treatment. We find that it advances in its progress up to about the tenth day; and I believe that the safest, and even the shortest method for treating it, is to let it run on till this period, without adopting useless trials to check it. After this period the lips of the urethra in the male, and other marks indicating the subsiding of the inflammation, show themselves, at which time the common balsamic and aromatic remedies may be administered with the fullest effect; and in another ten days they will often restore the membrane to a healthy condition. The slight stiffness and feeling of soreness in the inguinal glands which occur about the seventh or eighth day in the male, seem to me to mark the character of the complaint in the male, as I have never known it take place in the questionable discharges that often occur in this sex. Amongst the large number of females with gonorrhœa that present in the hospital, it rarely happens that any one is seen without affections of the glands, and the painful state of them is not transitory, and simply a little suffering, as in the male; but they very commonly proceed to the suppurative stage, and not very infrequently affect both groins. In the female the marked characters discriminating the gonorrhœal from all other discharges in the beginning of the complaint, is the viscid quality of it, causing the parts to adhere to the clothes. But as this character is soon lost, and the painful sensations subside, it becomes difficult in the latter stage of the complaint in women, to decide when the infectious quality of the secretions has ceased to exist. I have known instances, in both sexes, where the quality of infection remained, although the discharge was reduced to the least possible quantity. There seems to be, as I have seen reason for supposing, in both sexes a state of the structures of some persons that is favourable for keeping up gonorrhœa. In the female wards I have invariably found that women of loose cellular tissues will have the complaint linger very long. And in subjects with sandy hair the gonorrhœa is not only more persisting, but the affections of the glands more readily run into extensive ulcerations. I may repeat that I have seen cases where the discharge has proceeded uninterruptedly diminishing, and become reduced to the smallest possible quantity, and intercourse has communicated the disease. Under these circumstances I should never think of giving an affirmative answer to the weighty question which decides whether the capability of infection has ceased. But if the course of the discharge has ceased, and after an intermission of some days has re-appeared, I am disposed to believe that this renewed secretion will not communicate the disease.

The treatment of this complaint seems to rest very much, in the female, on local measures; but in the male the safe and most effectual way is, to conduct the case upon general principles, and by moderating the symptoms without disturbing their course, and not resorting to the specific remedies until a proper time, we shall then rarely fail to cure the disease kindly and without delay. I have constantly seen that if those remedies which are regarded as specific, be thrown in at the earliest period of gonorrhœa, they not only have not had any influence in arresting its course, but that they have afterwards, when resorted to again at a more suitable period, been quite devoid of showing any power of stopping the complaint. Their full efficacy is never so strikingly marked as when administered on the decline of the symptoms; and the success of the treatment is displayed most fully by keeping the active stage stationary in the seat which it first takes possession of, by avoiding every circumstance that can tend to cause a change in its locality.

Both sexes are liable to complaints that very closely simulate the gonorrhœal disease. This occurs to men who have an irritable stricture, or at least an irritable urethra, who find on some excitement a sudden appearance of copious discharge; and if it appears after intercourse, it may be so soon as twelve hours, and at once of a purulent character. It is accompanied with the slightest sensation on passing water, but no distressing pain in case of erection, and the orifice of the urethra is only slightly more red than in the natural state, and there is no uneasiness on crossing the legs; neither is there any stiffness or tenderness in the glands of the groins; and the discharge has not the peculiar fetor that we discover in the gonorrhœal matter, nor its clamminess. The symptoms of this spontaneous complaint usually remain a short time without increasing, and then they cease without any apparent cause or decided course of treatment.

The disease which has acquired the name of sloughing phagedæna appears to me to be one of the consequences of gonorrhœa. It is in the female sex that we usually find it with all the marked characters of its condition. Gonorrhœa in this sex is often kept up for a long period, and its activity constantly increased by the mode of life, and the absence of those attentions to cleanliness that even in health are required; and thus the discharge becomes a poison to the surfaces that are continually subject to its contact; and from the construction and close application of the adjoining parts, the irritating matter is under very favourable circumstances for imparting its injurious qualities over the wide surface which is exposed to its action. It is very common to find females with gonorrhœa, who have had piles, suffering much from the irritating effect of the discharge upon the fold of skin which that complaint has left, and the delicate cutaneous tissue around the anus is also commonly greatly irritated. In short, in long-continued gonorrhœa in this sex, the surface in the neighbourhood of the vulva is often highly inflamed. The effect of the unabating continuance of the gonorrhœa is to expose the parts unceasingly to the poisonous action of the secretion, which in its application is now combined with the moderate friction that must occur in the movements of the body: to these circumstances we may perhaps rightly impute the fact, that the sloughing phagedæna more commonly presents itself in the parts adjoining to, than in the vulva itself, or in the outer margins of the labia. The earliest state in which I have seen it occur is that of a black spot, but more usually the sphacelated part is, at least in some degree, detached from the living structures, so that it is accompanied by ulceration. But whether there be only a gangrenous spot, or accompanying ulceration, the pain is marked by its invariable severity, which allows no intermission in the patient's sufferings. This symptom seems to arise from the state of the cutis, the edge of which is tumid and highly inflamed, and the ulcerated margin of this structure is of a most unhealthy character. I had formerly many cases in succession of this complaint, and I found that opium only moderated the pain, and that the commonly adopted plans of supporting, or even of altering the state of the system, proved unavailing in arresting the progress of the disease. It suggested itself to me to have recourse to some mere local application to destroy the part. With this view I directed the nitric acid to be applied to a bad case that I had then under cure. The result was most satisfactory, and since this case occurred it has been adopted with invariable success. The effect of the acid is at once to remove completely the pain, and place the patient in the most comfortable state, after writhing about from the severity of suffering; and however excited the pulse and state of the patient may have been previously to the application, the circulation immediately subsides into a tranquil state, and the patient becomes quite calm and composed, and can sleep and take nourishment. From these circumstances I regard the disease as strictly local.

As these cases are so commonly met with in females, I have regarded the well-characterised disease as being peculiar to them. I have seen cases where slough has formed on the glans penis, of a painful nature, and where the application of the acid has been advantageously applied; but these have never had the peculiar appearance of the edges of the sore which accompanies the other. I have known cases where chancrous matter has formed a gangrenous spot on the glans that might be readily taken for this disease; and I believe I may say that most of the cases of this character that I have seen in the male have ultimately exhibited the symptoms of syphilis. In the female I have not found that the sore, after the application of the acid, has ever put on a chancrous character, or that any symptoms have ultimately appeared that could be referred to such a source. In the sloughing phagedæna the edges, which are everted, turgid, and inflamed to a certain extent, immediately after the application of the acid, become turned down, smooth, and the inflammation of the adjoining parts nearly disappears.

Much is said respecting the Hunterian chancre, as it is sometimes called, and that in a way by which it might be inferred that there are varieties of chancres. From the observations I have made I do not recognise this supposed variety, and I cannot conceive that it should be found in the natural course of things. We find that the character of the variolous pustule and of the vaccine vesicle is peculiar as well as uniform, each kind differing in the alteration produced in the structure of the cutis where they occur. When completely formed, these become adventitious organs, calculated for the development of a series of constitutional affections, each preserving its structural individuality, and each calculated for the production of its own peculiar manifestations. Thus a chancre is the organ in which the poison when inserted is kept up, and which if left unaltered, establishes a regular train of symptoms invading other parts in succession. The establishment of the organ in the vaccine disease consists in a process which unfolds the cellular arrangement of the structure of the cutis, and the peculiar secretion which has the property of communicating the disease is deposited in the cells. In the same way, analogous changes may be described of the variolous pustule, although the construction of the organ is different. These local changes in them seem to be limited in their duration to the formation of the organ for continuing the disease, for the local machinery disappears after the secretion has fully acquired the communicating principle.

We have in the chancre also a peculiar construction of an organ, differing indeed from those which are alluded to above, inasmuch as the poisonous matter is secreted on the surface of a spot of a part of which the structure is completely altered in its condition, so as to give to the touch a feeling of induration not unlike cartilage. This kind of change in structure seems to form the essential character of chancre. We know that it is an organ formed of such a character to complete those series of symptoms that are understood to display the full course of the venereal disease, for although a chancre may heal, yet, if the hardness continues, constitutional symptoms will follow.

It seems to me quite gratuitous to suppose that there are varieties of chancres, there being no analogy of such a latitude of states in small-pox or the vaccine vesicle; yet there are varieties in the conditions of chancres depending upon adventitious circumstances, in some measure necessarily arising out of the differences of the structures on which they are formed. Thus it is that a chancre on the inside of the prepuce, or on the glans penis, will have greater thickening than when it occurs on the outside, on the surface of the integument of the penis, in which situation, owing to the thinness of the cutis and delicacy of the subjacent tissue, there occurs little depth of induration. On the inner side, where there is a greater scope for thickening, the sore but slowly enlarges its dimensions; but if the sore is on the outer integument, it then enlarges comparatively quickly, and sometimes we have very large chancres in this situation, where they generally look very florid. On the labium pudendorum the chancre assumes a tubercular form, as it does also on the scrotum: in both the natural structure of the part is quite different from that of the others; and although the thickening of the chancre may be of a spongy kind, it is still more condensed than the proper tissue of the part.

These are circumstances that produce some slight varieties in chancres, even when left to their natural course. But the great differences in the appearances which chancres present depend upon the changes and checks which they suffer by the interference of injudicious art. The venereal disease is so much known and discussed by all classes, that every one fancies he knows something about it, and therefore the chancre that is presented to the surgeon is too often disguised to appear in its true light. Even the practitioner is too much disposed to apply nitrate of silver, by which he is often deprived of convincing proofs of the unequivocal nature of the disease during the course of treatment. There is no doubt that occasionally external treatment may be instituted that will arrest the entire course of a chancre, but most commonly any local means for disturbing the true formation of it, will only lead to uncertainty in the future treatment, causing embarrassment to the surgeon, and delaying the recovery of the patient; and, therefore, whatever course is then adopted, it is likely to be broken in upon, and not to be carried out with that steadiness which the complete recovery of the patient from this disease requires.

Notwithstanding the continual resort to some means for arresting the full development of a chancre, we still find that patients are not saved from the attack of secondary symptoms of syphilis; we may therefore reasonably conclude that in the application of those measures which influence the chancre, some changes may likewise be often produced in the regular course of the secondary symptoms, either in the time of their occurrence, or in the order in which they follow: and thus the practice of interfering locally with the progress of chancres is likely to throw obscurity on the symptoms which may occur in the sequel of the complaint.

I am convinced that when a surgeon is conducting the treatment of a chancre, he places himself in the best position for meeting occasional changes, and for calculating the power of the means he may have to adopt, by his having the sore in its most unsophisticated state. The enemy is before the surgeon's face, and he can conduct his tactics in the most masterly way that may be required. In short, the changes in the aspect of the sore point out the change to be adopted in the degree in which the remedy is to be urged. We have no positive index of the influence of mercury derived from the degree of effect it produces upon the salivary system, or from the state of the gums. In some individuals the almost imperceptible effect on these parts will be sufficient to produce a cure, whilst in another a much severer state is required before the well-known improvement takes place.

I have more than once known undoubted symptoms of syphilis follow a small induration, without ulceration, of the precise gristly hardness of chancre, situated on the prepuce. This fact serves to support the presumption that the malignity of the disease is developed by means of the peculiar construction of this hardness. It is not at all unusual to find that as the sore heals the hardness increases; and I have often noticed that the hardness has been greater after the sore has quite healed than at the time when the treatment was begun. But this is not the case if the remedy be pushed on to a powerful degree of action. We also find that the progress of a chancre is slow in proportion to the degree of thickening which is established; and further, that the sensibility of the sore is less in the same degree: by which it often happens that patients present themselves who have had the disease for many weeks before they are aware of it. In these cases a most vexatious state of things will often take place, which Mr. Hunter has noticed. It is that, however judiciously and steadily the remedy may have been administered; yet when the chancre is apparently perfectly cured, very quickly after the remedy is suspended, secondary symptoms will nevertheless present themselves.

It is so much a received opinion in the profession that what are called buboes arise from the absorption of the poison from a chancre, that I may surprise most surgeons by rejecting this supposition. I have observed that the glands are never affected in the insensible kind of chancre, where there is the great hardness, which is admitted to be the characteristic of the complaint, and where there is no irritation at the same time upon the penis. For when the glands are affected in the male, there may always be found an irritable spot in some part of the organ.

I have indeed found that buboes arise most commonly where there is only simple excoriation. But besides this indolent chancre there are conditions of chancre of the most active kind, so that its progress speedily runs into extensive ulceration, and even into death of some of the structures. It is not at all uncommon to see cases where a chancre has been established on the inside of the prepuce, and by the patient committing a series of excesses, or by suffering considerable irritation, by friction or otherwise of the part, a slough has been produced, which has destroyed a considerable portion of the foreskin; and in such cases in the course of a little time, after this slough has been thrown off, the sore has assumed clearly the character of a chancre; and I have often seen this state of the local affection followed by secondary symptoms. A patient presented himself to me with a portion of his prepuce about the size of a shilling completely black; it was not painful, but the texture underneath appeared more solid than the other parts. After some days, I found it had extended some way round the penis, and was the size of a half-crown; it had now become exceedingly painful, but still there were no marks of separation between the black mass and the surrounding living structures. The pain still continued, and in a few days longer a slight indication showed itself of a process having been begun to throw off this dead part, for so it proved to be; and the character of the sore which now became visible, as well as the increased induration of it, convinced me that it was a chancre. I commenced the use of mercury by inunction; and as soon as the mouth became in the slightest way affected, the pain diminished and the black mass more completely separated, which was of considerable substance; by the continuance of this plan the sore asssumed a healthy aspect, and readiness to heal. This case has convinced me that the venereal poison has the power of producing death of a part even without adventitious circumstances to favour such a condition of things, for the patient was a quiet discreet gentleman, using every caution from the moment he had placed himself in a situation that might lead him to fear that he had been infected. In this case the absorbent glands were not the least affected.

The essential condition of a chancre consisting so much in the hardness which is established, it is not enough to have the influence of the medicine carried only so far as to see the viscid discharge removed from the surface, and the sore assume the fine vermilion red colour which the influence of mercury produces, and to think that now the patient has done enough, for even in this healing state the sore has the power of communicating the disease. But it must be impressed upon the mind of the patient that the treatment is only to be considered at an end when all hardness has disappeared. And moreover, it is not to be supposed, because a chancre may become an irritable sore, and the part on which the sore is seated may have sloughed and destroyed in this way the chancre, that, therefore, a patient is secured from the train of secondary symptoms.

I have already alluded to the circumstance of the progress which a chancre makes in regard to its size, which is inversely as the degree of harding in its early formation. It is in this way we have presented to us occasionally very long-standing chancres, the patient not having looked upon them as such, owing to the little pain and discharge they have caused. It is not unusual to see a chancre that has quite healed, but owing to the remedy having been left off before the hardness was removed, the sore has broke out again upon the surface of this hard spot.

I think it must be allowed on consideration of all the points to which I have alluded, that there may follow at least uncertainty and embarrassment in setting about to cure a chancre by caustics or other local means; and in this way incurring a great probability of placing the patient in a distressing position. I do not dispute the fact that the chancres may be completely cured by merely local treatment, and even the development of the constitutional symptoms be prevented; but there is such uncertainty in the accomplishment of the object, that the attempt of fulfilling the purpose may well be regarded as the commencement of a train of difficulties and embarrassments, disappointing the surgeon, and harassing the patient.

After appreciating all the opposing influences that are calculated to divert the secondary symptoms of syphilis from taking the ordinary train, we still observe, under every circumstance, that they have a stated order in their course. It has not appeared to me that one kind of eruption is invariably accompanied with its peculiar kind of sore in the fauces. But I have observed that the ulceration of the fauces does not accompany the eruption when the iris is inflamed. The influence of mercury seems to be more readily apparent in cases of secondary symptoms than in the chancre, and therefore as this medicine is so often given partially, irregularly, or inadequately, the secondary symptoms must very often be seen in a way to obscure the real features of the disease. In examining patients with this disease it is not uncommon to find the velum palati inflamed, and no appearance of a sore upon it; in such a state of things the progress of the case will soon present a complete perforation of the part, the inflammation having been merely the expression of an ulcer which had commenced on the posterior surface of this membrane. There is one circumstance that could not be unexpected, knowing as we do how very painfully and distressingly patients swallow who have the membrane of the fauces inflamed, which is, that venereal sores either on the tonsils or on the velum, even if they be large and inflamed, produce little inconvenience of this kind. The way patients have of pronouncing guttural words is expressive of the existing ulceration. It is almost invariably a symptom, to have pain darting through to the ear on the side in which the ulceration exists.

From all that I have observed I am persuaded that besides the stages of syphilis, which are acknowledged as primary and secondary, there is a well marked class of ternary symptoms, in which are included the syphilitic affections of bones and periosteum; and to this class I refer the ulceration which forms at the back of the pharynx. In the third stage we include diseases of the bony structure of the nose; but when these bones are diseased, we never find an ulcer of the tonsils or of the velum; and on the other hand, I have hardly ever seen ulceration at the back of the pharynx without disease of the nasal bones. I have seen these venereal ulcers at the back of the pharynx go on to such a depth, as to interest the bodies of the vertebræ, and end in syphilitic necrosis of them. In this class I am inclined to place those sores which form in the scalp, rather than in the second, for when allowed to take their course they involve the pericranium and the bone.

There are sores presenting themselves in the limbs, which, as I have also found them occurring after the patient has been treated for secondary symptoms, I think should be included with those of the third stage. I allude to such ulcers as take the figure of a horse-shoe. But a more formidable description of sores than these are those which assume a circular form. Each of these ulcers differs in the appearance of the various parts of the sore itself; the centre being of a more healthy character than the circumference, where the edges are everted and irritable. When these sores are numerous, and spread with rapidity, they present a form of disease of the most serious kind, and place the patient in the greatest danger. If this form of the disease be not rapid in its progress, it may be readily controlled by a steady and sufficient mercurial impression. In the more moderate state, the discharge being viscid, and concreting on the least exposure to the atmosphere, produces an accumulated succession of hardened scabs, that successively form over the sore, as it goes on increasing in size, which crust has acquired the name of rupia from the form it takes, but this is a mere contingency, and not an essential character in the disease. If the sores be numerous, and advancing with rapidity under the peculiar ulcerative process that is taking place, the constitution then suffers so much, that it will not always bear the powerful exhibition of mercury, which active treatment can alone arrest the progress of the complaint; under this aggravated condition of the complaint, I have occasionally seen patients die of the venereal disease. The action of mercury is capable of curing this as well as that of the other forms, but it must be a full and steady impression of the remedy that can alone effect the purpose. The activity and rapidity of the sores, and their injurious influence on the system, sometimes interfere with the due administration of it, but where it can be made to have its full operation it is quite sufficient for the cure. I have seen instances of patients, in this state of disease, although suffering all the annoyances of a full salivation, declare themselves quite strong to what they were before the mercury was used, having their appetite restored and their nights good, and feeling altogether renovated. The state of relief they thus experience is a proof that the influence of syphilis produces the greatest constitutional disturbance.

We may discover a peculiar physiognomy in patients labouring under syphilis, as we do in other diseases. The destructive nature of this form of the disease is so great that I feel assured I should often have lost a patient if I had not the means of fumigating the whole body by one process, by which means the remedy is applied to all the sores, and whilst it changes their surfaces to a more healthy aspect, at the same time it charges the system with the mercury; so that it has often happened that on one application the patient has become surprisingly improved. Indeed the improvement of the patient's condition has been sometimes so great and rapid by the continuance of the remedy, that I have seen them even get fat, with a very sore mouth. The elasticity of the constitution rapidly restores the functions of health when the pressure of disease is alleviated.

Some medical men have promulgated doctrines respecting syphilitic disease of bones in which I can by no means coincide. It has been asserted that the affections which have been formerly referred to the disease, have really arisen from the remedy. Imputations have been thrown upon mercury as the cause of creating that disease, which it has so long enjoyed the character of curing. There are peculiarities in the condition of syphilitic necrosis that do not present themselves ordinarily in other states of necrosis. I apprehend that no surgeon can mistake the peculiarly offensive fetor of necrosed bone arising from syphilis; it is too powerful and too singular to be confounded with any other impression on the sense of smell. This peculiar fetor is immediately removed at the very time the mercurial action is made apparent in the system. This effect of the medicine is quite incompatible with the supposition that it produces the disease. Another peculiarity of this disease of bone is the very slow advance of the processes engaged in producing exfoliation. We for a long while have to look in vain for the establishment of that sulcus which we are in the habit of seeing in ordinary cases, when exfoliation has commenced. I have known the greatest misery result from the want of discrimination in cases of venereal necrosis. A gentleman had venereal necrosis of the parietal bone, he was put under the influence of mercury so far as to stay the progress of the disease but no further, and then the surgeon proposed and was allowed to adopt, the removal of the diseased part; but afterwards the adjoining bone became similarly necrosed, and the fetor returned; in this state of things a second operation of removing more bone was resorted to, but the disease still went on, and the only result was, that the patient was doomed to pass the rest of his existence in disgust with himself, and terminated a short life in misery.

We find that a provision is made for the safety of the brain in necrosis of bones of the cranium in this disease, as we find on other occasions before the death is complete in both tables, a process is set up for forming openings or cloacæ throughout the substance of the bone, so that no injurious effect may arise from the collection of matter on the dura mater; but if the outer table only is affected, this provision not being required, no foramina are formed. It is thus that a very large portion of the skull may be necrosed, and the patient may not suffer the least cerebral disturbance.

As the pain of venereal necrosis has its own character, so it is the first symptom that gives way under the use of mercury; if the pain improves we shall soon find the fetor of the bone cease, and the perfect cure will follow, by following up a long and unabated continuance of the especial remedy. We must bear in mind that all the changes in bone are slowly carried on, and so it is in this disease. If the remedy is not pursued long after the symptoms have apparently been cured, a recurrence of disease is sure to take place. I have formerly seen the most aggravated cases of extreme syphilitic disease of bones cured by the steadfast perseverance of the surgeon in the employment of mercury; and after such a course the health of the patient has been in all respects restored.

The necessity of strictly complying with a long and undeviating employment of mercury in this disease of bones, has embarrassed surgeons in the employment of the remedy. When they have destroyed what might be considered the leading symptoms of the disease, they have suspended the remedy, supposing enough has been done, and when, after a short period, a renewal of the disease has taken place in the part, they have really supposed that the cause of the renewed disease has been the effect of the remedy. The fact is that this re-appearance in the bones will take place oftener than once, and even the peculiar fetor repeatedly return, if the treatment is not perseveringly carried out for a long time.

Although mercury has often had its character depreciated and brought into competition with other proposed remedies, it has still maintained its superiority and unequivocal qualities in syphilis; the profession have lately widely extended the application of this mineral, and placed the greatest confidence in its use in the treatment of a large class of diseases, even when used most actively; but nevertheless in syphilis it has been regarded as if it made encroaches upon the system beyond what it is allowed to do, when employed in as free a manner in other diseases. The influence this remedy has over a chancre at the very point of time at which the mouth proves that the system is impressed with it, is very clearly marked. And I conceive it to be a great advantage in the treatment to leave the primary sore unchanged by local measures, inasmuch as the progress it assumes offers a safe index for guiding the surgeon in the best way for making his variations in the employment of the remedy, suitably to the changes. I had a patient who had a well marked chancre on the inside of the prepuce; he was made to use the ointment, and in three days ptyalism came on; of course the remedy was stopped, and in about a week afterwards the sore was quite healed, and the hardness, which had been considerable, was gone. The annoyance in this case of the state of the mouth, was hardly to be compared to the usual tedious discomfort of the more common treatment of chancres. I object to the use of the caustic as it neither saves time, nor the administration of mercury; indeed it generally adds to the lengthened course of this medicine.

The mode of using mercury by inunction is in my mind by far the most safe and complete way of coping with the disease. It acts equably in keeping up the mercurial impression, which is a condition necessary in the treatment for procuring the steady course, required for completely and without delay subduing the symptoms. And by this plan the stomach and bowels are saved from the derangement and irritation which the internal use of the remedy produces, and by saving these annoyances it impairs the constitution in the least possible degree. But the great advantage in using the ointment is, that it has so much more power in getting rid of the hardness of a chancre than any other means.

It appears to me that in the use of this remedy, it is very important that it should be carried on most steadily until the period arrives when it is deemed fit to be given up, in order that the most perfect advantage may be derived from it. I have seen great embarrassments arise from adopting a method of employing it by intervals and starts. It is also necessary to bear in mind that if unexpectedly the mouth becomes exceedingly bad, and the mercury of course is stopped, the soreness of the mouth will remain long after the mercury has ceased to act on the system; so that if the suspension be continued until the mouth be well, the disease may take a turn to increase instead of improving. I have many times seen this disease retrograding, by a chancre becoming worse, whilst the patient was suffering much in his mouth, which, when bad, requires a long time to heal, and this may be long after the mercurial effect on the system is over. It appears that with those persons who are remarkably susceptible to the influence of mercury, there is also an equal readiness for throwing off the mercurial action.

I have found that in the administration of mercury for a chancre in females, as soon as the mouth is affected the sore will get well, and the hardness will be quickly removed; so that a short continuance of the medicine is usually sufficient in this sex to complete the cure. We find that a chancre on the frænum is longer in being acted upon by the mercurial influence, than when its seat is on the glans penis or prepuce. I apprehend that the circumstance of the situation of these parts in respect of the circulation may explain both these facts. I may mention here that although we so invariably find buboes accompanying gonorrhœa in the female sex, yet I observe that they are rarely attendant on chancres which occur in them.

I have reason to speak in the highest terms of the cinnabar fumigation, which I have never found to fail in arresting the ravages of the rapid ulceration, that we often find so formidable in the throat, and also in the penis; usually only one or two applications are required to change entirely the character of the sores, and to convert the destructive state to a process of healing.

In the observations I have had the opportunity of making when employing iodine, I have not been so far satisfied with its powers as to consider it fully capable of curing syphilis. It certainly will divert the course of the disease and relieve symptoms, but I have found that when the medicine has been discontinued, symptoms of the disease have returned in an unequivocal character. Nevertheless, there is a state, after the disease has run a long course, of a painful condition of the periosteum in which the iodine seems to be decidedly efficacious.

I have reason to believe that a long-continued and mild administration of mercury makes a greater encroachment upon the constitution than a more severe and shorter one. The powers of the system seem to be more lowered by the constant influence of a depressing cause, although mild, than by a more sudden and complete change from their ordinary course. In the latter state they seem to rise from a depressed state with renewed activity, and direct all their energies for carrying on the functions of life with vigour.

I have been often told by patients who have undergone a mercurial process, that they then have felt in better health than they had previously experienced for years.

The inquiries which we usually put to patients who present themselves with cancer of the breast, as to the time and mode of occurrence of the disease, produce such unsatisfactory answers, that we cannot regard the disease otherwise than spontaneous in its origin. Its commencement being very insidious we have rarely the opportunity of seeing a case without a similarly altered condition of the absorbent glands in the neighbourhood, a condition of things that I believe deters all surgeons from advising the removal of the breast. It is right to bear in mind, when examining the glands, that they are in the first period of their scirrhous state very little if at all enlarged, but yet have the peculiar hardness of the disease. A lady who was advanced in years consulted me for some little difficulty in swallowing, and a degree of stiffness which she felt at the root of the tongue. On inspecting the fauces I could discover nothing unusual; but on tracing the glands down the neck, I found one or two low down, small, but as hard as shot. This convinced me the case was one of early stage of carcinoma, and the event proved the truth of the suspicion. She retired to her friends in the country, and after enduring a horrible state of suffering, died in no long time afterwards of the disease.

I have observed that when cancer occurs early in life, its advances are somewhat more rapid, and also that it more quickly recurs after an operation, than at a later period; whereas in aged women, in whom the function of the breast may be said not to form a part in the economy of the system, the disease does not seem to interfere much with the functions of life. The breast itself becomes sluggish, and its living powers are only adequate to maintaining the life without the superadded function of the organ. I have known females with this complaint, who, having escaped the ulcerative process of the disease before they were old, have lived to upwards of eighty years of age without any breach of the skin, and in a very tolerable state of comfort. That period of life at which the menstruating process ceases, certainly gives greater activity to the ravages of the complaint.

If I confine my observations to those cases which I have had the opportunity of watching during the continuance of the patient's existence, I should come to the conclusion that the removal of unequivocal cancerous disease does not prolong life. Many cases are known to have been operated upon a second time, in consequence of a recurrence of the disease in the same part. This at once proves the fallacy of the proposition for operating at all in such cases. There are also contingencies of frequent occurrence that should have their due weight in the question of operating for this disease. I have known very many cases where the patient has died in very few days from erysipelas taking place in the wound; and a very unfortunate case I knew where a surgeon was induced to remove a merely schirrous tumour from a remarkably healthy old lady of eighty-four, who died within a week in this way. The re-appearance of the disease after removal is too humiliating to a surgeon not to make him very anxious for having the best grounds for deciding on the operation. There is a condition of carcinoma in which the surgeon may justly put it to the determination of the patient to submit to the operation; it is where the progress of the complaint has gone so far as to produce a large mass of diseased structure in a state of ulceration, pouring forth a great deal of offensive discharge. It is possible the patient may wish to be saved from this great annoyance, at least for some short time, at the expense of an operation.

There is a form of cancer doubtlessly well known to surgeons where the scirrhus has commenced in the mammary gland, but very soon afterwards the integuments, instead of remaining smooth and delicate as in the other parts of the body of the individual, become stiff and then hard, and afterwards become more like brawn than any thing else. The disease spreads in all directions, generally accompanied with tubercles of the skin, and by means of its hardness and extent so presses on the mamma, that this part becomes shrunk up to a very small body. I have seen this change of structure continued round the body so that the patient was quite hide-bound, producing the greatest pain. I have more than once seen a modification of this description of case in which ulceration took place, and where the entire gland seemed to be removed, leaving the parts apparently in a healing state. However, the disease soon resumed its real character, and destroyed the patient. In these cases the axillary glands have been early affected, and the same change in the integument has taken place over them, and in the arm, causing the most excruciating pain. Indeed, when the disease springs up in the axillary glands, after the removal of the breast, the patient has to go through the greatest suffering from the enormous œdema of the arm.

If proofs are wanting to convince us that carcinoma is not merely a local disease even at the earliest period of its appearance, it must be more readily allowed that the malignant fungus is the manifestation of a peculiarly diseased condition of the constitution. The constant sequel to a removal of a tumour of this sort, whether in the breast or in an extremity, is the disclosure that some gland that was not discoverable before, quickly becomes affected, and rapidly advances in the same form of disease, or what is even more commonly found to be the case, some of the viscera are invaded in the same way. It seems almost as if the removal of one local part roused the system to exhibit the destructive powers of the disease in other parts.

I have generally found that patients with this disease, although they have a coated tongue and a quick pulse, express themselves as feeling well. I have also noticed that on the removal of a fungous tumour the wound is disposed to heal rapidly, and without going through the free suppurative stage, which in other cases would be expected. In examining bodies after death operated on for this disease in the testis, I have found that large masses of the disease in the lumbar glands have surrounded, but not pressed upon the vena cava, leaving the circulation of the blood in it quite free, and the tube of the vessel appeared to be deposited in a canal, without being at all interfered with by the pressure of the surrounding mass. This is not what we find to be the case in the growth of tumours generally. I witnessed the same state of things in the ham of a patient, where a fungous growth had formed; on dissection it was found that the popliteal vessels were lodged in the mass, undisturbed by its proximity. In this case there had been no swelling or pain in the leg; in short, nothing to indicate that the circulating or nervous systems of the limb were suffering from pressure.

I have invariably observed, as fungous growths generally take their origin from the deeper structures in the limbs, so when the fascia is divided over them, for the sake of ascertaining the nature of the disease, or otherwise, that from this moment, the growth, freed as it were from its prison-house, advances with great rapidity in size, and soon terminates the life of the patient.

EXPLANATION OF THE DIAGRAMS.

Fig. 1. — This figure is intended to show not only the way in which the ordinary dislocation of the humerus takes place, but also the circumstances that result from the displacement. A person finding himself falling, and at the same time throwout his arm to save the fall, places the greater part of the weight of his body upon the hand, and simultaneously the muscles designed for bringing the arm to the trunk, particularly the pectoralis major and latissimus dorsi, are spontaneously called into strong action: thus the points of motion of the limb are altogether changed. The centre of motion is now removed from the centre of the head of the humerus to the place of insertion of these two muscles; by which the whole limb becomes a lever of the first kind, the weight of the body resting upon the hand being the moving power. The centre of motion is now transferred below the head, which part is carried downwards, and forcibly pressed into the axilla. In this way all those muscles which are employed by their associated actions to preserve the head in the socket, and to move the limb around its appointed centre of motion, are so deranged and diverted from the order of their proper combined actions, that they are excited by this derangement to make a powerful resistance to all the efforts that may be made with a view to the reduction of the bone.

Fig. 2. — When the phalanges of the fingers or toes are dislocated, the lateral ligaments being entire, the displaced bone is clasped close to the other in a parallel direction; and therefore, by the laws of the resolution and composition of forces, it must be in vain to draw the luxated bone in the line of its axis for the purpose of replacing it. The practice of surgeons proves the truth of these principles, in the constant frustration of such kind of attempts. These two figures are designed to show two ways of conducting the reduction of these bones; the one by placing the luxated bone over the other at right angles, and pressing the end onwards until it gets clearly to the middle of the joint, in which position the other end may be made to revolve into its proper place; the other method that will succeed is, by drawing away the distal end of the luxated bone as far as it will go, and then pressing the other or proximal end into its position.

Fig. 3. — It is too readily conceived that the inclined plane accomplishes all the purposes that are intended in the employment of it in cases of fractures. It must be remembered that it does not support the whole weight of the body placed upon it, but only an amount corresponding to the proportion which the base bears to the perpendicular of the triangle which it forms, and that when the angle is 45 degrees it only supports one half of the weight. It thus happens that when used for a fractured thigh, the weight of the leg is always acting in a way to drag the knee downwards, and with it the lower portion of the broken bone, by which, as the angle of the apparatus forms a fulcrum, the upper extremity of this part is tilted upwards, out of the proper axis of the thigh. This part is also directed outwards, owing to the difference in the hamstring muscles.

Fig. 4. is intended to point out the difference of the effects of a blow on the head when transmitted in a line directed towards the base of the cranium, by which the force is received by the central part of the brain, influencing greatly the cerebral functions, and the effects of the blow which is directed in a line at right angles to the vertical lines, where the force is received and transmitted from side to side on the upper part of the brain, and producing but little disturbance of its functions.

Fig. 5. is intended to give some notion, although a very imperfect one, of the different effects of the diaphragm arising from its peculiar arched form. The difference in the curvature of its fibres in various parts, must necessarily propagate very different forces to some of its parts than it does to others. Where the perpendiculars to tangents are directed most thickly, at that spot the action of the muscle will be exerted most powerfully.

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